



6560-50-P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 52

[EPA-R04-OAR-2010-0219-201148; FRL-9639-2]

Approval and Promulgation of Air Quality Implementation Plans; State of North Carolina; Regional Haze State Implementation Plan

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule.

SUMMARY: EPA is proposing a limited approval of a revision to the North Carolina state implementation plan (SIP) submitted by the State of North Carolina through the North Carolina Department of Environment and Natural Resources, Division of Air Quality (NCDAQ), on December 17, 2007, that addresses regional haze for the first implementation period. This revision addresses the requirements of the Clean Air Act (CAA) and EPA's rules that require states to prevent any future and remedy any existing anthropogenic impairment of visibility in mandatory Class I areas (national parks and wilderness areas) caused by emissions of air pollutants from numerous sources located over a wide geographic area (also referred to as the "regional haze program"). States are required to assure reasonable progress toward the national goal of achieving natural visibility conditions in Class I areas. EPA is proposing a limited approval of this SIP revision to implement the regional haze requirements for North Carolina on the basis that the revision, as a whole, strengthens the North Carolina SIP. In a separate action, EPA has proposed a limited disapproval of the North Carolina regional haze SIP because of deficiencies in the State's regional haze SIP submittal arising from the remand by the U.S. Court

of Appeals for the District of Columbia Circuit (D.C. Circuit) to EPA of the Clean Air Interstate Rule (CAIR). Consequently, EPA is not proposing to take action in this rulemaking to address the State's reliance on CAIR to meet certain regional haze requirements.

DATES: Comments must be received on or before [insert date 30 days from the date of publication in the Federal Register].

ADDRESSES: Submit your comments, identified by Docket ID No. EPA-R04-OAR-2010-0219, by one of the following methods:

1. www.regulations.gov: Follow the on-line instructions for submitting comments.
2. E-mail: benjamin.lynorae@epa.gov.
3. Fax: 404-562-9019.
4. Mail: EPA-R04-OAR-2010-0219, Regulatory Development Section, Air Planning Branch, Air, Pesticides and Toxics Management Division, U.S. Environmental Protection Agency, Region 4, 61 Forsyth Street, SW, Atlanta, Georgia 30303-8960.
5. Hand Delivery or Courier: Lynorae Benjamin, Chief, Regulatory Development Section, Air Planning Branch, Air, Pesticides and Toxics Management Division, U.S. Environmental Protection Agency, Region 4, 61 Forsyth Street, SW, Atlanta, Georgia 30303-8960. Such deliveries are only accepted during the Regional Office's normal hours of operation. The Regional Office's official hours of business are Monday through Friday, 8:30 to 4:30, excluding federal holidays.

Instructions: Direct your comments to Docket ID No. “EPA-R04-OAR-2010-0219.” EPA’s policy is that all comments received will be included in the public docket without change and may be made available online at www.regulations.gov, including any personal information provided, unless the comment includes information claimed to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Do not submit through www.regulations.gov or e-mail, information that you consider to be CBI or otherwise protected. The www.regulations.gov website is an “anonymous access” system, which means EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an e-mail comment directly to EPA without going through www.regulations.gov, your e-mail address will be automatically captured and included as part of the comment that is placed in the public docket and made available on the Internet. If you submit an electronic comment, EPA recommends that you include your name and other contact information in the body of your comment and with any disk or CD-ROM you submit. If EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, EPA may not be able to consider your comment. Electronic files should avoid the use of special characters, any form of encryption, and be free of any defects or viruses. For additional information about EPA’s public docket visit the EPA Docket Center homepage at <http://www.epa.gov/epahome/dockets.htm>.

Docket: All documents in the electronic docket are listed in the www.regulations.gov index. Although listed in the index, some information is not publicly available, i.e., CBI or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the Internet and will be publicly available only in hard copy form.

Publicly available docket materials are available either electronically in www.regulations.gov or in hard copy at the Regulatory Development Section, Air Planning Branch, Air, Pesticides and Toxics Management Division, U.S. Environmental Protection Agency, Region 4, 61 Forsyth Street, SW, Atlanta, Georgia 30303-8960. EPA requests that if at all possible, you contact the person listed in the **FOR FURTHER INFORMATION CONTACT** section to schedule your inspection. The Regional Office's official hours of business are Monday through Friday, 8:30 to 4:30, excluding federal holidays.

FOR FURTHER INFORMATION CONTACT: Sara Waterson or Michele Notarianni, Regulatory Development Section, Air Planning Branch, Air, Pesticides and Toxics Management Division, U.S. Environmental Protection Agency, Region 4, 61 Forsyth Street, SW, Atlanta, Georgia 30303-8960. Sara Waterson can be reached at telephone number (404) 562-9061 and by electronic mail at waterson.sara@epa.gov. Michele Notarianni can be reached at telephone number (404) 562-9031 and by electronic mail at notarianni.michele@epa.gov.

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I. What Action is EPA Proposing?

EPA is proposing a limited approval of North Carolina's December 17, 2007, SIP revision addressing regional haze under CAA sections 301(a) and 110(k)(3) because the revision as a whole strengthens the North Carolina SIP. This proposed rulemaking and the accompanying Technical Support Document¹ (TSD) explain the basis for EPA's proposed limited approval action.²

¹EPA's TSD to this action, entitled "*Technical Support Document for North Carolina Regional Haze SIP Submittal*," is included in the public docket for this action.

² Under CAA sections 301(a) and 110(k)(6) and EPA's long-standing guidance, a limited approval results in approval of the entire SIP submittal, even of those parts that are deficient and prevent EPA from granting a full approval of the SIP revision. *Processing of State Implementation Plan (SIP) Revisions*, EPA Memorandum from

In a separate action, EPA has proposed a limited disapproval of the North Carolina regional haze SIP because of deficiencies in the State's regional haze SIP submittal arising from the State's reliance on CAIR to meet certain regional haze requirements. *See* 76 FR 82219 (December 30, 2011). EPA is not proposing to take action in today's rulemaking on issues associated with North Carolina's reliance on CAIR in its regional haze SIP. Comments on EPA's proposed limited disapproval of North Carolina's regional haze SIP are accepted at the docket for EPA's December 30, 2011, proposed rulemaking (*see* Docket ID No. EPA-HQ-OAR-2011-0729). The comment period for EPA's December 30, 2011, proposed rulemaking is scheduled to end on February 28, 2012.

II. What is the Background for EPA's Proposed Action?

A. The Regional Haze Problem

Regional haze is visibility impairment that is produced by a multitude of sources and activities which are located across a broad geographic area and emit fine particles (PM_{2.5}) (e.g., sulfates, nitrates, organic carbon, elemental carbon, and soil dust), and their precursors (e.g., sulfur dioxide (SO₂), nitrogen oxides (NO_x), and in some cases, ammonia (NH₃) and volatile organic compounds (VOC)). Fine particle precursors react in the atmosphere to form fine particulate matter which impairs visibility by scattering and absorbing light. Visibility impairment reduces the clarity, color, and visible distance that one can see. PM_{2.5} can also cause serious health effects and mortality in humans and contributes to environmental effects such as acid deposition and eutrophication.

John Calcagni, Director, Air Quality Management Division, OAQPS, to Air Division Directors, EPA Regional Offices I-X, September 7, 1992, (1992 Calcagni Memorandum) located at: <http://www.epa.gov/ttn/caaa/t1/memoranda/siproc.pdf>.

Data from the existing visibility monitoring network, the “Interagency Monitoring of Protected Visual Environments” (IMPROVE) monitoring network, show that visibility impairment caused by air pollution occurs virtually all the time at most national park and wilderness areas. The average visual range³ in many Class I areas⁴ (i.e., national parks and memorial parks, wilderness areas, and international parks meeting certain size criteria) in the western United States is 100-150 kilometers, or about one-half to two-thirds of the visual range that would exist without anthropogenic air pollution. In most of the eastern Class I areas of the United States, the average visual range is less than 30 kilometers, or about one-fifth of the visual range that would exist under estimated natural conditions. *See* 64 FR 35715 (July 1, 1999).

B. Requirements of the CAA and EPA’s Regional Haze Rule (RHR)

In section 169A of the 1977 Amendments to the CAA, Congress created a program for protecting visibility in the nation’s national parks and wilderness areas. This section of the CAA establishes as a national goal the “prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I areas which impairment results from manmade air pollution.” On December 2, 1980, EPA promulgated regulations to address visibility impairment in Class I areas that is “reasonably attributable” to a single source or small group of sources, i.e., “reasonably attributable visibility impairment.” *See* 45 FR 80084. These regulations represented

³ Visual range is the greatest distance, in kilometers or miles, at which a dark object can be viewed against the sky.

⁴ Areas designated as mandatory Class I areas consist of national parks exceeding 6,000 acres, wilderness areas and national memorial parks exceeding 5,000 acres, and all international parks that were in existence on August 7, 1977. *See* 42 U.S.C. 7472(a). In accordance with section 169A of the CAA, EPA, in consultation with the Department of Interior, promulgated a list of 156 areas where visibility is identified as an important value. *See* 44 FR 69122 (November 30, 1979). The extent of a mandatory Class I area includes subsequent changes in boundaries, such as park expansions. *See* 42 U.S.C. 7472(a). Although states and tribes may designate as Class I additional areas which they consider to have visibility as an important value, the requirements of the visibility program set forth in section 169A of the CAA apply only to “mandatory Class I Federal areas.” Each mandatory Class I Federal area is the responsibility of a “Federal Land Manager.” *See* 42 U.S.C. 7602(i). When the term “Class I area” is used in this action, it means a “mandatory Class I Federal area.”

the first phase in addressing visibility impairment. EPA deferred action on regional haze that emanates from a variety of sources until monitoring, modeling and scientific knowledge about the relationships between pollutants and visibility impairment were improved.

Congress added section 169B to the CAA in 1990 to address regional haze issues. EPA promulgated a rule to address regional haze on July 1, 1999 (64 FR 35713), the RHR. The RHR revised the existing visibility regulations to integrate into the regulation provisions addressing regional haze impairment and established a comprehensive visibility protection program for Class I areas. The requirements for regional haze, found at 40 CFR 51.308 and 51.309, are included in EPA's visibility protection regulations at 40 CFR 51.300-309. Some of the main elements of the regional haze requirements are summarized in section III of this preamble. The requirement to submit a regional haze SIP applies to all 50 states, the District of Columbia, and the Virgin Islands.⁵ 40 CFR 51.308(b) requires states to submit the first implementation plan addressing regional haze visibility impairment no later than December 17, 2007.

C. Roles of Agencies in Addressing Regional Haze

Successful implementation of the regional haze program will require long-term regional coordination among states, tribal governments and various federal agencies. As noted above, pollution affecting the air quality in Class I areas can be transported over long distances, even hundreds of kilometers. Therefore, to effectively address the problem of visibility impairment in Class I areas, states need to develop strategies in coordination with one another, taking into account the effect of emissions from one jurisdiction on the air quality in another.

⁵ Albuquerque/Bernalillo County in New Mexico must also submit a regional haze SIP to completely satisfy the requirements of section 110(a)(2)(D) of the CAA for the entire State of New Mexico under the New Mexico Air Quality Control Act (section 74-2-4).

Because the pollutants that lead to regional haze can originate from sources located across broad geographic areas, EPA has encouraged the states and tribes across the United States to address visibility impairment from a regional perspective. Five regional planning organizations (RPOs) were developed to address regional haze and related issues. The RPOs first evaluated technical information to better understand how their states and tribes impact Class I areas across the country, and then pursued the development of regional strategies to reduce emissions of particulate matter (PM) and other pollutants leading to regional haze.

The Visibility Improvement State and Tribal Association of the Southeast (VISTAS) RPO is a collaborative effort of state governments, tribal governments, and various federal agencies established to initiate and coordinate activities associated with the management of regional haze, visibility and other air quality issues in the Southeastern United States. Member state and tribal governments include: Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, West Virginia, and the Eastern Band of the Cherokee Indians.

III. What Are the Requirements for Regional Haze SIPs?

A. The CAA and the RHR

Regional haze SIPs must assure reasonable progress towards the national goal of achieving natural visibility conditions in Class I areas. Section 169A of the CAA and EPA's implementing regulations require states to establish long-term strategies for making reasonable progress toward meeting this goal. Implementation plans must also give specific attention to certain stationary sources that were in existence on August 7, 1977, but were not in operation before August 7, 1962, and require these sources, where appropriate, to install BART controls

for the purpose of eliminating or reducing visibility impairment. The specific regional haze SIP requirements are discussed in further detail below.

B. Determination of Baseline, Natural, and Current Visibility Conditions

The RHR establishes the deciview as the principal metric or unit for expressing visibility. This visibility metric expresses uniform changes in haziness in terms of common increments across the entire range of visibility conditions, from pristine to extremely hazy conditions. Visibility expressed in deciviews is determined by using air quality measurements to estimate light extinction and then transforming the value of light extinction using a logarithm function. The deciview is a more useful measure for tracking progress in improving visibility than light extinction itself because each deciview change is an equal incremental change in visibility perceived by the human eye. Most people can detect a change in visibility at one deciview.⁶

The deciview is used in expressing RPGs (which are interim visibility goals towards meeting the national visibility goal), defining baseline, current, and natural conditions, and tracking changes in visibility. The regional haze SIPs must contain measures that ensure “reasonable progress” toward the national goal of preventing and remedying visibility impairment in Class I areas caused by anthropogenic air pollution by reducing anthropogenic emissions that cause regional haze. The national goal is a return to natural conditions, i.e., anthropogenic sources of air pollution would no longer impair visibility in Class I areas.

To track changes in visibility over time at each of the 156 Class I areas covered by the visibility program (40 CFR 81.401-437), and as part of the process for determining reasonable progress, states must calculate the degree of existing visibility impairment at each Class I area at the time of each regional haze SIP submittal and periodically review progress every five years midway through each 10-year implementation period. To do this, the RHR requires states to

⁶ The preamble to the RHR provides additional details about the deciview. See 64 FR 35714, 35725 (July 1, 1999).

determine the degree of impairment (in deciviews) for the average of the 20 percent least impaired (“best”) and 20 percent most impaired (“worst”) visibility days over a specified time period at each of their Class I areas. In addition, states must also develop an estimate of natural visibility conditions for the purpose of comparing progress toward the national goal. Natural visibility is determined by estimating the natural concentrations of pollutants that cause visibility impairment and then calculating total light extinction based on those estimates. EPA has provided guidance to states regarding how to calculate baseline, natural and current visibility conditions in documents titled, EPA’s *Guidance for Estimating Natural Visibility conditions under the Regional Haze Rule*, September 2003, (EPA-454/B-03-005 located at http://www.epa.gov/ttncaaa1/t1/memoranda/rh_envcurhr_gd.pdf), (hereinafter referred to as “EPA’s 2003 Natural Visibility Guidance”), and *Guidance for Tracking Progress Under the Regional Haze Rule*, September 2003, (EPA-454/B-03-004 located at http://www.epa.gov/ttncaaa1/t1/memoranda/rh_tpurhr_gd.pdf), (hereinafter referred to as “EPA’s 2003 Tracking Progress Guidance”).

For the first regional haze SIPs that were due by December 17, 2007, “baseline visibility conditions” were the starting points for assessing “current” visibility impairment. Baseline visibility conditions represent the degree of visibility impairment for the 20 percent least impaired days and 20 percent most impaired days for each calendar year from 2000 to 2004. Using monitoring data for 2000 through 2004, states are required to calculate the average degree of visibility impairment for each Class I area, based on the average of annual values over the five-year period. The comparison of initial baseline visibility conditions to natural visibility conditions indicates the amount of improvement necessary to attain natural visibility, while the future comparison of baseline conditions to the then current conditions will indicate the amount

of progress made. In general, the 2000 - 2004 baseline period is considered the time from which improvement in visibility is measured.

C. Determination of Reasonable Progress Goals (RPGs)

The vehicle for ensuring continuing progress towards achieving the natural visibility goal is the submission of a series of regional haze SIPs from the states that establish two RPGs (i.e., two distinct goals, one for the “best” and one for the “worst” days) for every Class I area for each (approximately) 10-year implementation period. The RHR does not mandate specific milestones or rates of progress, but instead calls for states to establish goals that provide for “reasonable progress” toward achieving natural (i.e., “background”) visibility conditions. In setting RPGs, states must provide for an improvement in visibility for the most impaired days over the (approximately) 10-year period of the SIP, and ensure no degradation in visibility for the least impaired days over the same period.

States have significant discretion in establishing RPGs, but are required to consider the following factors established in section 169A of the CAA and in EPA’s RHR at 40 CFR 51.308(d)(1)(i)(A): (1) the costs of compliance; (2) the time necessary for compliance; (3) the energy and non-air quality environmental impacts of compliance; and (4) the remaining useful life of any potentially affected sources. States must demonstrate in their SIPs how these factors are considered when selecting the RPGs for the best and worst days for each applicable Class I area. States have considerable flexibility in how they take these factors into consideration, as noted in EPA’s *Guidance for Setting Reasonable Progress Goals Under the Regional Haze Program*, (“EPA’s Reasonable Progress Guidance”), July 1, 2007, memorandum from William L. Wehrum, Acting Assistant Administrator for Air and Radiation, to EPA Regional Administrators, EPA Regions 1-10 (pp. 4-2, 5-1). In setting the RPGs, states must also consider

the rate of progress needed to reach natural visibility conditions by 2064 (referred to as the “uniform rate of progress” or the “glidepath”) and the emissions reduction measures needed to achieve that rate of progress over the 10-year period of the SIP. Uniform progress towards achievement of natural conditions by the year 2064 represents a rate of progress which states are to use for analytical comparison to the amount of progress they expect to achieve. In setting RPGs, each state with one or more Class I areas (“Class I state”) must also consult with potentially “contributing states,” i.e., other nearby states with emissions sources that may be affecting visibility impairment at the Class I state’s areas. *See* 40 CFR 51.308(d)(1)(iv).

D. Best Available Retrofit Technology (BART)

Section 169A of the CAA directs states to evaluate the use of retrofit controls at certain larger, often uncontrolled, older stationary sources in order to address visibility impacts from these sources. Specifically, section 169A(b)(2)(A) of the CAA requires states to revise their SIPs to contain such measures as may be necessary to make reasonable progress towards the natural visibility goal, including a requirement that certain categories of existing major stationary sources⁷ built between 1962 and 1977 procure, install, and operate the “Best Available Retrofit Technology” as determined by the state. Under the RHR, states are directed to conduct BART determinations for such “BART-eligible” sources that may be anticipated to cause or contribute to any visibility impairment in a Class I area. Rather than requiring source-specific BART controls, states also have the flexibility to adopt an emissions trading program or other alternative program as long as the alternative provides greater reasonable progress towards improving visibility than BART.

⁷The set of “major stationary sources” potentially subject to BART is listed in CAA section 169A(g)(7).

On July 6, 2005, EPA published the *Guidelines for BART Determinations Under the Regional Haze Rule* at Appendix Y to 40 CFR Part 51 (hereinafter referred to as the “BART Guidelines”) to assist states in determining which of their sources should be subject to the BART requirements and in determining appropriate emissions limits for each applicable source. In making a BART determination for a fossil fuel-fired electric generating plant with a total generating capacity in excess of 750 megawatts (MW), a state must use the approach set forth in the BART Guidelines. A state is encouraged, but not required, to follow the BART Guidelines in making BART determinations for other types of sources.

States must address all visibility-impairing pollutants emitted by a source in the BART determination process. The most significant visibility impairing pollutants are SO₂, NO_x, and PM. EPA has stated that states should use their best judgment in determining whether VOC or NH₃ compounds impair visibility in Class I areas.

Under the BART Guidelines, states may select an exemption threshold value for their BART modeling, below which a BART-eligible source would not be expected to cause or contribute to visibility impairment in any Class I area. The state must document this exemption threshold value in the SIP and must state the basis for its selection of that value. Any source with emissions that model above the threshold value would be subject to a BART determination review. The BART Guidelines acknowledge varying circumstances affecting different Class I areas. States should consider the number of emission sources affecting the Class I areas at issue and the magnitude of the individual sources’ impacts. Any exemption threshold set by the state should not be higher than 0.5 deciview.

In their SIPs, states must identify potential BART sources, described as “BART-eligible sources” in the RHR, and document their BART control determination analyses. In making

BART determinations, section 169A(g)(2) of the CAA requires that states consider the following factors: (1) the costs of compliance, (2) the energy and non-air quality environmental impacts of compliance, (3) any existing pollution control technology in use at the source, (4) the remaining useful life of the source, and (5) the degree of improvement in visibility which may reasonably be anticipated to result from the use of such technology. States are free to determine the weight and significance to be assigned to each factor.

A regional haze SIP must include source-specific BART emission limits and compliance schedules for each source subject to BART. Once a state has made its BART determination, the BART controls must be installed and in operation as expeditiously as practicable, but no later than five years after the date of EPA approval of the regional haze SIP. *See* CAA section 169(g)(4); *see* 40 CFR 51.308(e)(1)(iv). In addition to what is required by the RHR, general SIP requirements mandate that the SIP must also include all regulatory requirements related to monitoring, recordkeeping, and reporting for the BART controls on the source.

As noted above, the RHR allows states to implement an alternative program in lieu of BART so long as the alternative program can be demonstrated to achieve greater reasonable progress toward the national visibility goal than would BART. Under regulations issued in 2005 revising the regional haze program, EPA made just such a demonstration for CAIR. *See* 70 FR 39104 (July 6, 2005). EPA's regulations provide that states participating in the CAIR cap-and-trade program under 40 CFR part 96 pursuant to an EPA-approved CAIR SIP or which remain subject to the CAIR Federal Implementation Plan in 40 CFR part 97 need not require affected BART-eligible electrical generating (EGUs) to install, operate, and maintain BART for emissions of SO₂ and NO_x. *See* 40 CFR 51.308(e)(4). Because CAIR did not address direct emissions of PM, states were still required to conduct a BART analysis for PM emissions from

EGUs subject to BART for that pollutant. Challenges to CAIR, however, resulted in the remand of the rule to EPA. *See North Carolina v. EPA*, 550F.3d 1175 (D.C. Cir. 2008).

EPA issued a new rule in 2011 to address the interstate transport of NO_x and SO₂ in the eastern United States. *See* 76 FR 48208 (August 8, 2011) (“the Transport Rule,” also known as the Cross-State Air Pollution Rule). On December 30, 2011, EPA proposed to find that the trading programs in the Transport Rule would achieve greater reasonable progress towards the national goal than would BART in the states in which the Transport Rule applies. *See* 76 FR 82219. Based on this proposed finding, EPA also proposed to revise the RHR to allow states to substitute participation in the trading programs under the Transport Rule for source-specific BART. EPA has not yet taken final action on that rule. Also on December 30, 2011, the D.C. Circuit issued an order addressing the status of the Transport Rule and CAIR in response to motions filed by numerous parties seeking a stay of the Transport Rule pending judicial review. In that order, the D.C. Circuit stayed the Transport Rule pending the court’s resolutions of the petitions for review of that rule in *EME Homer Generation, L.P. v. EPA* (No. 11-1302 and consolidated cases). The court also indicated that EPA is expected to continue to administer CAIR in the interim until the court rules on the petitions for review of the Transport Rule.

E. Long-Term Strategy (LTS)

Consistent with the requirement in section 169A(b) of the CAA that states include in their regional haze SIP a 10 to 15 year strategy for making reasonable progress, section 51.308(d)(3) of the RHR requires that states include a LTS in their regional haze SIPs. The LTS is the compilation of all control measures a state will use during the implementation period of the specific SIP submittal to meet applicable RPGs. The LTS must include “enforceable emissions

limitations, compliance schedules, and other measures as necessary to achieve the reasonable progress goals” for all Class I areas within, or affected by emissions from, the state. *See* 40 CFR 51.308(d)(3).

When a state’s emissions are reasonably anticipated to cause or contribute to visibility impairment in a Class I area located in another state, the RHR requires the impacted state to coordinate with the contributing states in order to develop coordinated emissions management strategies. *See* 40 CFR 51.308(d)(3)(i). In such cases, the contributing state must demonstrate that it has included, in its SIP, all measures necessary to obtain its share of the emissions reductions needed to meet the RPGs for the Class I area. The RPOs have provided forums for significant interstate consultation, but additional consultations between states may be required to sufficiently address interstate visibility issues. This is especially true where two states belong to different RPOs.

States should consider all types of anthropogenic sources of visibility impairment in developing their LTS, including stationary, minor, mobile, and area sources. At a minimum, states must describe how each of the following seven factors listed below are taken into account in developing their LTS: (1) emissions reductions due to ongoing air pollution control programs, including measures to address RAVI; (2) measures to mitigate the impacts of construction activities; (3) emissions limitations and schedules for compliance to achieve the RPG; (4) source retirement and replacement schedules; (5) smoke management techniques for agricultural and forestry management purposes including plans as currently exist within the state for these purposes; (6) enforceability of emissions limitations and control measures; and (7) the anticipated net effect on visibility due to projected changes in point, area, and mobile source emissions over the period addressed by the LTS. *See* 40 CFR 51.308(d)(3)(v).

F. Coordinating Regional Haze and Reasonably Attributable Visibility Impairment (RAVI) LTS

As part of the RHR, EPA revised 40 CFR 51.306(c) regarding the LTS for RAVI to require that the RAVI plan must provide for a periodic review and SIP revision not less frequently than every three years until the date of submission of the state's first plan addressing regional haze visibility impairment, which was due December 17, 2007, in accordance with 40 CFR 51.308(b) and (c). On or before this date, the state must revise its plan to provide for review and revision of a coordinated LTS for addressing RAVI and regional haze, and the state must submit the first such coordinated LTS with its first regional haze SIP. Future coordinated LTS's, and periodic progress reports evaluating progress towards RPGs, must be submitted consistent with the schedule for SIP submission and periodic progress reports set forth in 40 CFR 51.308(f) and 51.308(g), respectively. The periodic review of a state's LTS must report on both regional haze and RAVI impairment and must be submitted to EPA as a SIP revision.

G. Monitoring Strategy and Other Implementation Plan Requirements

Section 51.308(d)(4) of the RHR includes the requirement for a monitoring strategy for measuring, characterizing, and reporting of regional haze visibility impairment that is representative of all mandatory Class I areas within the state. The strategy must be coordinated with the monitoring strategy required in section 51.305 for RAVI. Compliance with this requirement may be met through "participation" in the IMPROVE network, i.e., review and use of monitoring data from the network. The monitoring strategy is due with the first regional haze SIP, and it must be reviewed every five years. The monitoring strategy must also provide for

additional monitoring sites if the IMPROVE network is not sufficient to determine whether RPGs will be met.

The SIP must also provide for the following:

- Procedures for using monitoring data and other information in a state with mandatory Class I areas to determine the contribution of emissions from within the state to regional haze visibility impairment at Class I areas both within and outside the state;
- Procedures for using monitoring data and other information in a state with no mandatory Class I areas to determine the contribution of emissions from within the state to regional haze visibility impairment at Class I areas in other states;
- Reporting of all visibility monitoring data to the Administrator at least annually for each Class I area in the state, and where possible, in electronic format;
- Developing a statewide inventory of emissions of pollutants that are reasonably anticipated to cause or contribute to visibility impairment in any Class I area. The inventory must include emissions for a baseline year, emissions for the most recent year for which data are available, and estimates of future projected emissions. A state must also make a commitment to update the inventory periodically; and
- Other elements, including reporting, recordkeeping, and other measures necessary to assess and report on visibility.

The RHR requires control strategies to cover an initial implementation period extending to the year 2018, with a comprehensive reassessment and revision of those strategies, as appropriate, every 10 years thereafter. Periodic SIP revisions must meet the core requirements of section 51.308(d) with the exception of BART. The requirement to evaluate sources for BART

applies only to the first regional haze SIP. Facilities subject to BART must continue to comply with the BART provisions of section 51.308(e), as noted above. Periodic SIP revisions will assure that the statutory requirement of reasonable progress will continue to be met.

H. Consultation with States and Federal Land Managers (FLMs)

The RHR requires that states consult with FLMs before adopting and submitting their SIPs. *See* 40 CFR 51.308(i). States must provide FLMs an opportunity for consultation, in person and at least 60 days prior to holding any public hearing on the SIP. This consultation must include the opportunity for the FLMs to discuss their assessment of impairment of visibility in any Class I area and to offer recommendations on the development of the RPGs and on the development and implementation of strategies to address visibility impairment. Further, a state must include in its SIP a description of how it addressed any comments provided by the FLMs. Finally, a SIP must provide procedures for continuing consultation between the state and FLMs regarding the state's visibility protection program, including development and review of SIP revisions, five-year progress reports, and the implementation of other programs having the potential to contribute to impairment of visibility in Class I areas.

IV. What is EPA's Analysis of North Carolina's Regional Haze Submittal?

On December 17, 2007, NCDAQ submitted revisions to the North Carolina SIP to address regional haze in the State's Class I areas as required by EPA's RHR.

A. Affected Class I Areas

North Carolina has five Class I areas within its borders: Great Smoky Mountains National Park, Joyce Kilmer-Slickrock Wilderness Area, Linville Gorge Wilderness Area, Shining Rock Wilderness Area, and Swanquarter Wilderness Area. Two of these Class I areas (Great Smoky Mountains and Joyce Kilmer) also fall within the geographic boundaries of Tennessee. Therefore, both North Carolina and Tennessee are responsible for developing their own regional haze SIPs that address these two Class I areas and for consulting with other states that impact the areas. The two states worked together to determine appropriate RPGs, including consulting with other states that impact these two Class I areas, as discussed in section IV.F.1 of this rulemaking. In addition, both North Carolina and Tennessee are responsible for describing their own long-term emissions strategies, their role in the consultation processes, and how their particular state SIP meets the other requirements in EPA's regional haze regulations.

The North Carolina regional haze SIP establishes RPGs for visibility improvement at each of these Class I areas and a LTS to achieve those RPGs within the first regional haze implementation period ending in 2018. In developing the LTS for each area, North Carolina considered both emissions sources inside and outside of North Carolina that may cause or contribute to visibility impairment in North Carolina's Class I areas. The State also identified and considered emissions sources within North Carolina that may cause or contribute to visibility impairment in Class I areas in neighboring states as required by 40 CFR 51.308(d)(3). The VISTAS RPO worked with the State in developing the technical analyses used to make these determinations, including state-by-state contributions to visibility impairment in specific Class I areas, which included the five areas in North Carolina and those areas affected by emissions from North Carolina.

B. Determination of Baseline, Natural, and Current Visibility Conditions

As required by the RHR and in accordance with EPA's 2003 Natural Visibility Guidance, North Carolina calculated baseline/current and natural visibility conditions for each of its Class I areas, as summarized below (and as further described in sections III.B.1 and III.B.2 of EPA's TSD to this Federal Register action).

1. Estimating Natural Visibility Conditions

Natural background visibility, as defined in EPA's 2003 Natural Visibility Guidance, is estimated by calculating the expected light extinction using default estimates of natural concentrations of fine particle components adjusted by site-specific estimates of humidity. This calculation uses the IMPROVE equation, which is a formula for estimating light extinction from the estimated natural concentrations of fine particle components (or from components measured by the IMPROVE monitors). As documented in EPA's 2003 Natural Visibility Guidance, EPA allows states to use "refined" or alternative approaches to the 2003 EPA guidance to estimate the values that characterize the natural visibility conditions of the Class I areas. One alternative approach is to develop and justify the use of alternative estimates of natural concentrations of fine particle components. Another alternative is to use the "new IMPROVE equation" that was adopted for use by the IMPROVE Steering Committee in December 2005.⁸ The purpose of this refinement to the "old IMPROVE equation" is to provide more accurate estimates of the various factors that affect the calculation of light extinction. North Carolina opted to use the default

⁸ The IMPROVE program is a cooperative measurement effort governed by a steering committee composed of representatives from federal agencies (including representatives from EPA and the FLMs) and RPOs. The IMPROVE monitoring program was established in 1985 to aid the creation of Federal and State implementation plans for the protection of visibility in Class I areas. One of the objectives of IMPROVE is to identify chemical species and emissions sources responsible for existing anthropogenic visibility impairment. The IMPROVE program has also been a key participant in visibility-related research, including the advancement of monitoring instrumentation, analysis techniques, visibility modeling, policy formulation and source attribution field studies.

estimates for the natural concentrations combined with the “new IMPROVE equation” for all of its Class I areas. Using this approach, natural visibility conditions using the new IMPROVE equation were calculated separately for each Class I area by VISTAS.

The new IMPROVE equation takes into account the most recent review of the science⁹ and it accounts for the effect of particle size distribution on light extinction efficiency of sulfate, nitrate, and organic carbon. It also adjusts the mass multiplier for organic carbon (particulate organic matter) by increasing it from 1.4 to 1.8. New terms are added to the equation to account for light extinction by sea salt and light absorption by gaseous nitrogen dioxide. Site-specific values are used for Rayleigh scattering (scattering of light due to atmospheric gases) to account for the site-specific effects of elevation and temperature. Separate relative humidity enhancement factors are used for small and large size distributions of ammonium sulfate and ammonium nitrate and for sea salt. The terms for the remaining contributors, elemental carbon (light-absorbing carbon), fine soil, and coarse mass terms, do not change between the original and new IMPROVE equations.

2. Estimating Baseline Conditions

NCDAQ estimated baseline visibility conditions at the State’s five Class I areas using available monitoring data from four IMPROVE monitoring sites. The Joyce Kilmer-Slickrock Wilderness Area does not contain an IMPROVE monitor. In cases where onsite monitoring is

⁹ The science behind the revised IMPROVE equation is summarized in numerous published papers. See, e.g., Hand, J.L., and Malm, W.C., 2006, *Review of the IMPROVE Equation for Estimating Ambient Light Extinction Coefficients - Final Report*. March 2006. Prepared for Interagency Monitoring of Protected Visual Environments (IMPROVE), Colorado State University, Cooperative Institute for Research in the Atmosphere, Fort Collins, Colorado.
http://vista.cira.colostate.edu/improve/publications/GrayLit/016_IMPROVEEqReview/IMPROVEEqReview.htm; and Pitchford, Marc., 2006, *Natural Haze Levels II: Application of the New IMPROVE Algorithm to Natural Species Concentrations Estimates*. Final Report of the Natural Haze Levels II Committee to the RPO Monitoring/Data Analysis Workgroup. September 2006.
http://vista.cira.colostate.edu/improve/Publications/GrayLit/029_NaturalCondII/naturalhazelevelsIIreport.ppt.

not available, 40 CFR 51.308(d)(2)(i) requires states to use the most representative monitoring available for the 2000-2004 period to establish baseline visibility conditions, in consultation with EPA. North Carolina used, and EPA is proposing to find adequate North Carolina's use of, 2000-2004 data from the IMPROVE monitor at Great Smoky Mountains National Park for the Joyce Kilmer-Slickrock Wilderness Area. The IMPROVE Steering Committee considers the IMPROVE monitor at the Great Smoky Mountains to be representative of visibility in Joyce Kilmer. The Great Smoky Mountains National Park is the nearest Class I area and contiguous to Joyce Kilmer and they possess similar characteristics, such as meteorology and topography.

As explained in section III.B, for the first regional haze SIP, baseline visibility conditions are the same as current conditions. A five-year average of the 2000 to 2004 monitoring data was calculated for each of the 20 percent worst and 20 percent best visibility days at each North Carolina Class I area. IMPROVE data records for Great Smoky Mountains National Park and the Linville Gorge Wilderness Area for the period 2000 to 2004 meet the EPA requirements for data completeness. See page 2-8 of EPA's 2003 Tracking Progress Guidance. Shining Rock and Swanquarter Class I areas had missing data in more than one year between the years 2000 to 2004. Data records for these sites were filled using data substitution procedures. Tables 3.3-1, 3.3-2, 3.3-3, and 3.3-4 from Appendix G of the North Carolina regional haze SIP, also provided in section III.B.3 of EPA's TSD to this action, list the 20 percent best and worst days for the baseline period of 2000-2004 for the Great Smoky Mountains, Linville Gorge, Shining Rock, and Swanquarter areas, respectively. These data are also provided at the following website:

http://www.metro4-sesarm.org/vistas/SesarmBext_20BW.htm.

3. Summary of Baseline and Natural Conditions

For the North Carolina Class I areas, baseline visibility conditions on the 20 percent worst days range between approximately 24.5 and 30.5 deciviews. Natural visibility in these areas is predicted to be between approximately 11 and 12 deciviews on the 20 percent worst days. The natural and baseline conditions for North Carolina's Class I areas for both the 20 percent worst and best days are presented in Table 1 below.

Table 1: Natural Background and Baseline Conditions for North Carolina's Class I Areas

Class I Area	Average for 20% Worst Days (dv¹⁰)	Average for 20% Best Days (dv)
Natural Background Conditions		
Great Smoky Mountains National Park	11.05	4.54
Joyce Kilmer-Slickrock Wilderness Area	11.05	4.54
Linville Gorge Wilderness Area	11.19	4.08
Shining Rock Wilderness Area	11.47	2.51
Swanquarter Wilderness Area	11.55	5.46
Baseline Visibility Conditions (2000-2004)		
Great Smoky Mountains National Park	30.28	13.58
Joyce Kilmer-Slickrock Wilderness Area	30.28	13.58
Linville Gorge Wilderness Area	28.77	11.11
Shining Rock Wilderness Area	28.46	7.69
Swanquarter Wilderness Area	24.74	11.99

4. Uniform Rate of Progress

In setting the RPGs, North Carolina considered the uniform rate of progress needed to reach natural visibility conditions by 2064 ("glidepath") and the emissions reduction measures needed to achieve that rate of progress over the period of the SIP to meet the requirements of 40 CFR 51.308(d)(1)(i)(B). As explained in EPA's Reasonable Progress Guidance document, the

¹⁰ The term, "dv," is the abbreviation for "deciview."

uniform rate of progress is not a presumptive target, and RPGs may be greater than, less than, or equivalent to the glidepath.

The State's implementation plan presents two sets of graphs, one for the 20 percent best days, and one for the 20 percent worst days, for its five Class I areas. North Carolina constructed the graph for the worst days (i.e., the glidepath) in accordance with EPA's 2003 Tracking Progress Guidance by plotting a straight graphical line from the baseline level of visibility impairment for 2000-2004 to the level of visibility conditions representing no anthropogenic impairment in 2064 for its areas. For the best days, the graph includes a horizontal, straight line spanning from baseline conditions in 2004 out to 2018 to depict no degradation in visibility over the implementation period of the SIP. North Carolina's SIP shows that the State's RPGs for its areas provide for improvement in visibility for the 20 percent worst days over the period of the implementation plan and ensure no degradation in visibility for the 20 percent best days over the same period, in accordance with 40 CFR 51.308(d)(1).

For the Great Smoky Mountain and Joyce Kilmer Class I areas, the overall visibility improvement necessary to reach natural conditions is the difference between baseline visibility of 30.28 deciviews for the 20 percent worst days and natural conditions of 11.05 deciviews, i.e., 19.23 deciviews. Over the 60-year period from 2004 to 2064, this would require an approximate improvement of 0.321 deciview per year (i.e., $19.23 \text{ deciviews} / 60 \text{ years}$) to reach natural conditions. Hence, for the 14-year period from 2004 to 2018, in order to achieve visibility improvement at least equivalent to the uniform rate of progress for the 20 percent worst days at the Great Smoky Mountain and Joyce Kilmer areas, North Carolina would need to project at least 4.49 deciviews over the first implementation period (i.e., $0.321 \text{ deciview} \times 14 \text{ years} = 4.49 \text{ deciviews}$) of visibility improvement from the 30.28 deciviews baseline in 2004, resulting in

visibility levels at or below 25.79 deciviews in 2018. As discussed below in section IV.C.7, for the Great Smoky Mountain and Joyce Kilmer areas, North Carolina projects a 6.78 deciview improvement to visibility from the 30.28 deciview baseline to 23.50 deciviews in 2018 for the 20 percent most impaired days, and a 1.47 deciview improvement to 12.11 deciviews from the baseline visibility of 13.58 deciviews for the 20 percent least impaired days. Similar computations can be made for the other three North Carolina Class I areas.

C. Long-Term Strategy/Strategies

As described in section III.E of this action, the LTS is a compilation of state-specific control measures relied on by a state for achieving its RPGs. North Carolina's LTS for the first implementation period addresses the emissions reductions from federal, state, and local controls that take effect in the State from the end of the baseline period starting in 2004 until 2018. The North Carolina LTS was developed by the State, in coordination with the VISTAS RPO, through an evaluation of the following components: (1) identification of the emissions units within North Carolina and in surrounding states that likely have the largest impacts currently on visibility at the State's Class I areas; (2) estimation of emissions reductions for 2018 based on all controls required or expected under federal and state regulations for the 2004-2018 period (including BART); (3) comparison of projected visibility improvement with the uniform rate of progress for the State's Class I areas; and (4) application of the four statutory factors in the reasonable progress analysis for the identified emissions units to determine if additional reasonable controls were required.

In a separate action proposing limited disapproval of the regional haze SIPs of a number of states, EPA noted that these states relied on the trading programs of CAIR to satisfy the

BART requirement and the requirement for a LTS sufficient to achieve the state-adopted RPGs. *See* 76 FR 82219 (December 30, 2011). In that action, EPA proposed a limited disapproval of North Carolina's regional haze SIP submittal insofar as the SIP relied on CAIR. For that reason, EPA is not taking action on that aspect of North Carolina's regional haze SIP in this action. Comments on the December 30, 2011, proposed determination are accepted at Docket ID No. EPA-HQ-OAR-2011-0729. The comment period for EPA's December 30, 2011, proposed rulemaking is scheduled to end on February 28, 2012.

1. Emissions Inventory for 2018 with Federal and State Control Requirements

The emissions inventory used in the regional haze technical analyses was developed by VISTAS with assistance from North Carolina. The 2018 emissions inventory was developed by projecting 2002 emissions and applying reductions expected from federal and state regulations affecting the emissions of VOC and the visibility-impairing pollutants NO_x, PM, and SO₂. The BART Guidelines direct states to exercise judgment in deciding whether VOC and NH₃ impair visibility in their Class I area(s). As discussed further in section IV.C.3, VISTAS performed modeling sensitivity analyses, which demonstrated that anthropogenic emissions of VOC and NH₃ do not significantly impair visibility in the VISTAS region. Thus, while emissions inventories were also developed for NH₃ and VOC, and applicable federal VOC reductions were incorporated into North Carolina's regional haze analyses, North Carolina did not further evaluate NH₃ and VOC emissions sources for potential controls under BART or reasonable progress.

VISTAS developed emissions for five inventory source classifications: stationary point and area sources, off-road and on-road mobile sources, and biogenic sources. Stationary point

sources are those sources that emit greater than a specified tonnage per year, depending on the pollutant, with data provided at the facility level. Stationary area sources are those sources whose individual emissions are relatively small, but due to the large number of these sources, the collective emissions from the source category could be significant. VISTAS estimated emissions on a countywide level for the inventory categories of: a) stationary area sources; b) off-road (or non-road) mobile sources (i.e., equipment that can move but does not use roadways); and c) biogenic sources (which are natural sources of emissions, such as trees). On-road mobile source emissions are estimated by vehicle type and road type, and are summed to the countywide level.

There are many federal and state control programs being implemented that VISTAS and North Carolina anticipate will reduce emissions between the end of the baseline period and 2018. Emissions reductions from these control programs are projected to achieve substantial visibility improvement by 2018 in the North Carolina Class I areas. The control programs relied upon by North Carolina include CAIR; EPA's NO_x SIP Call; North Carolina's Clean Smokestacks Act (CSA); Georgia Rule 391-3-1-.02(2)(sss), "Multipollutant Control for Electric Utility Steam Generating Units;" consent decrees for Tampa Electric, Virginia Electric and Power Company, Gulf Power-Plant Crist, and American Electric Power; NO_x and/or VOC reductions from the control rules in 1-hour ozone SIPs for Atlanta, Birmingham, and Northern Kentucky; North Carolina's NO_x Reasonably Available Control Technology state rule for Philip Morris USA and Norandal USA in the Charlotte/Gastonia/Rock Hill 1997 8-hour ozone nonattainment area; federal 2007 heavy duty diesel engine standards for on-road trucks and buses; federal Tier 2 tailpipe controls for on-road vehicles; federal large spark ignition and recreational vehicle controls; and EPA's non-road diesel rules. Controls from various federal Maximum Achievable Control Technology (MACT) rules were also utilized in the development of the 2018 emissions

inventory projections. These MACT rules include the industrial boiler/process heater MACT (referred to as “Industrial Boiler MACT”), the combustion turbine and reciprocating internal combustion engines MACTs, and the VOC 2-, 4-, 7-, and 10-year MACT standards.

Effective July 30, 2007, the D.C. Circuit mandated the vacatur and remand of the Industrial Boiler MACT Rule.¹¹ This MACT was vacated since it was directly affected by the vacatur and remand of the Commercial and Industrial Solid Waste Incinerator Definition Rule. EPA proposed a new Industrial Boiler MACT rule to address the vacatur on June 4, 2010, (75 FR 32006) and issued a final rule on March 21, 2011 (76 FR 15608). The VISTAS modeling included emissions reductions from the vacated Industrial Boiler MACT rule, and North Carolina did not redo its modeling analysis when the rule was re-issued. Even though North Carolina’s modeling is based on the vacated Industrial Boiler MACT limits, the State’s modeling conclusions are unlikely to be affected because the expected reductions due to the vacated rule were relatively small compared to the State’s total SO₂, PM_{2.5}, and coarse particulate matter (PM₁₀) emissions in 2018 (i.e., 0.1 to 0.4 percent, depending on the pollutant, of the projected 2018 SO₂, PM_{2.5}, and PM₁₀ inventory). Thus, EPA does not expect that differences between the vacated and final Industrial Boiler MACT emissions limits would affect the adequacy of the existing North Carolina regional haze SIP. If there is a need to address discrepancies between projected emissions reductions from the vacated Industrial Boiler MACT and the Industrial Boiler MACT issued March 21, 2011 (76 FR 15608), EPA expects North Carolina to do so in the State’s five-year progress report.

Below in Tables 2 and 3 are summaries of the 2002 baseline and 2018 estimated emissions inventories for North Carolina.

¹¹ See *NRDC v. EPA*, 489 F.3d 1250 (D.C. Cir. 2007).

Table 2: 2002 Emissions Inventory Summary for North Carolina (tons per year)

	VOC	NO_x	PM_{2.5}	PM₁₀	NH₃	SO₂
Point	61,484	196,731	26,953	36,539	1,233	522,093
Area	250,044	41,517	83,520	300,838	162,183	5,815
On-Road Mobile	263,766	327,329	4,623	6,579	9,702	12,420
Off-Road Mobile	94,480	84,284	7,348	7,348	65	7,693
Total	669,774	649,861	122,444	351,304	173,183	548,021

Table 3: 2018 Emissions Inventory Summary for North Carolina (tons per year)

	VOC	NO_x	PM_{2.5}	PM₁₀	NH₃	SO₂
Point	71,247	94,276	37,789	48,354	2,073	148,972
Area	203,132	49,514	93,406	338,872	181,333	6,674
On-Road Mobile	101,099	87,791	2,123	4,392	14,065	1,481
Off-road Mobile	61,327	49,046	4,069	4,298	83	905
Total	436,805	280,627	137,387	395,916	197,554	158,032

2. Modeling to Support the LTS and Determine Visibility Improvement for Uniform Rate of Progress

VISTAS performed modeling for the regional haze LTS for the 10 southeastern states, including North Carolina. The modeling analysis is a complex technical evaluation that began with selection of the modeling system. VISTAS used the following modeling system:

- **Meteorological Model:** The Pennsylvania State University/National Center for Atmospheric Research Mesoscale Meteorological Model is a nonhydrostatic, prognostic meteorological model routinely used for urban- and regional- scale photochemical, PM_{2.5}, and regional haze regulatory modeling studies.
- **Emissions Model:** The Sparse Matrix Operator Kernel Emissions modeling system is an emissions modeling system that generates hourly gridded speciated emissions inputs of mobile, non-road mobile, area, point, fire and biogenic emissions sources for photochemical grid models.

- **Air Quality Model:** The EPA's Models-3/Community Multiscale Air Quality (CMAQ) modeling system is a photochemical grid model capable of addressing ozone, PM, visibility and acid deposition at a regional scale. The photochemical model selected for this study was CMAQ version 4.5. It was modified through VISTAS with a module for Secondary Organics Aerosols in an open and transparent manner that was also subjected to outside peer review.

CMAQ modeling of regional haze in the VISTAS region for 2002 and 2018 was carried out on a grid of 12x12 kilometer cells that covers the 10 VISTAS states (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, West Virginia) and states adjacent to them. This grid is nested within a larger national CMAQ modeling grid of 36x36 kilometer cells that covers the continental United States, portions of Canada and Mexico, and portions of the Atlantic and Pacific Oceans along the east and west coasts. Selection of a representative period of meteorology is crucial for evaluating baseline air quality conditions and projecting future changes in air quality due to changes in emissions of visibility-impairing pollutants. VISTAS conducted an in-depth analysis which resulted in the selection of the entire year of 2002 (January 1-December 31) as the best period of meteorology available for conducting the CMAQ modeling. The VISTAS states modeling was developed consistent with EPA's *Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, PM_{2.5}, and Regional Haze*, located at <http://www.epa.gov/scram001/guidance/guide/final-03-pm-rh-guidance.pdf>, (EPA-454/B-07-002), April 2007, and EPA document, *Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional*

Haze Regulations, located at <http://www.epa.gov/ttnchie1/eidocs/eiguid/index.html>, EPA-454/R-05-001, August 2005, updated November 2005 (“EPA’s Modeling Guidance”).

VISTAS examined the model performance of the regional modeling for the areas of interest before determining whether the CMAQ model results were suitable for use in the regional haze assessment of the LTS and for use in the modeling assessment. The modeling assessment predicts future levels of emissions and visibility impairment used to support the LTS and to compare predicted, modeled visibility levels with those on the uniform rate of progress. In keeping with the objective of the CMAQ modeling platform, air quality model performance was evaluated using graphical and statistical assessments based on measured ozone, fine particles, and acid deposition from various monitoring networks and databases for the 2002 base year. VISTAS used a diverse set of statistical parameters from the EPA’s Modeling Guidance to stress and examine the model and modeling inputs. Once VISTAS determined the model performance to be acceptable, VISTAS used the model to assess the 2018 RPGs using the current and future year air quality modeling predictions, and compared the RPGs to the uniform rate of progress.

In accordance with 40 CFR 51.308(d)(3), the State of North Carolina provided the appropriate supporting documentation for all required analyses used to determine the State’s LTS. The technical analyses and modeling used to develop the glidepath and to support the LTS are consistent with EPA’s RHR and interim and final EPA Modeling Guidance. EPA proposes to accept the VISTAS technical modeling to support the LTS and to determine visibility improvement for the uniform rate of progress because the modeling system was chosen and simulated according to EPA Modeling Guidance. EPA proposes to concur with the VISTAS

model performance procedures and results, and that the CMAQ is an appropriate tool for the regional haze assessments for the North Carolina LTS and regional haze SIP.

3. Relative Contributions to Visibility Impairment: Pollutants, Source Categories, and Geographic Areas

An important step toward identifying reasonable progress measures is to identify the key pollutants contributing to visibility impairment at each Class I area. To understand the relative benefit of further reducing emissions from different pollutants, source sectors, and geographic areas, VISTAS developed emissions sensitivity model runs using CMAQ to evaluate visibility and air quality impacts from various groups of emissions and pollutant scenarios in the Class I areas on the 20 percent worst visibility days.

Regarding which pollutants are most significantly impacting visibility in the VISTAS region, VISTAS' contribution assessment, based on IMPROVE monitoring data, demonstrated that ammonium sulfate is the major contributor to PM_{2.5} mass and visibility impairment at Class I areas in the VISTAS and neighboring states. On the 20 percent worst visibility days in 2000-2004, ammonium sulfate accounted for 75 to 87 percent of the calculated light extinction at the inland Class I areas in VISTAS, and 69 to 74 percent of the calculated light extinction for all but one of the coastal Class I areas in the VISTAS states. In particular, sulfate particles resulting from SO₂ emissions contribute to the calculated light extinction on the haziest days roughly 74 percent for the Swanquarter area, and 84 to 87 percent for the Great Smoky Mountains, Linville Gorge, and Shining Rock areas, depending on the area. In contrast, ammonium nitrate contributed less than five percent of the calculated light extinction at the VISTAS Class I areas on the 20 percent worst visibility days. Particulate organic matter (organic carbon) accounted for

20 percent or less of the light extinction on the 20 percent worst visibility days at the VISTAS Class I areas.

VISTAS grouped its 18 Class I areas into two types, either “coastal” or “inland” (sometimes referred to as “mountain”) sites, based on common/similar characteristics (e.g. terrain, geography, meteorology), to better represent variations in model sensitivity and performance within the VISTAS region and to describe the common factors influencing visibility conditions in the two types of Class I areas. All of North Carolina’s Class I areas, except for Swanquarter, are “inland” areas. Swanquarter is considered a “coastal” area.

Results from VISTAS’ emissions sensitivity analyses indicate that sulfate particles resulting from SO₂ emissions are the dominant contributor to visibility impairment on the 20 percent worst days at all Class I areas in VISTAS. North Carolina concluded that reducing SO₂ emissions from EGU and non-EGU point sources in the VISTAS states would have the greatest visibility benefits for the North Carolina Class I areas.

Because ammonium nitrate is a small contributor to PM_{2.5} mass and visibility impairment on the 20 percent worst days at the inland Class I areas in VISTAS, which include all of the North Carolina Class I areas except for the Swanquarter area, the benefits of reducing NO_x and NH₃ emissions at these sites are small. Some of the worst days at Swanquarter, and other coastal sites within the VISTAS region, occur in the winter when ammonium nitrate has a somewhat larger contribution to visibility impairment. North Carolina concluded that reducing ammonia emissions would be more beneficial for reducing ammonium nitrate contributions to visibility impairment in wintertime than further reducing NO_x emissions from either ground-level or point (elevated) sources. NCDAQ notes that for Swanquarter, the numerous hog farms in eastern North Carolina are the likely primary emissions sources for ammonia.

The VISTAS sensitivity analyses show that VOC emissions from biogenic sources such as vegetation also contribute to visibility impairment. However, control of these biogenic sources of VOC would be extremely difficult, if not impossible. The anthropogenic sources of VOC emissions are minor compared to the biogenic sources. Therefore, controlling anthropogenic sources of VOC emissions would have little, if any, visibility benefits at the Class I areas in the VISTAS region, including North Carolina. The sensitivity analyses also show that reducing primary carbon from point sources, ground level sources, or fires is projected to have small to no visibility benefit at the VISTAS Class I areas.

North Carolina considered the factors listed under 40 CFR 51.308(d)(3)(v) and in section III.E. of this action to develop its LTS as described below. North Carolina, in conjunction with VISTAS, demonstrated in its SIP that elemental carbon (a product of highway and non-road diesel engines, agricultural burning, prescribed fires, and wildfires), fine soils (a product of construction activities and activities that generate fugitive dust), and ammonia are relatively minor contributors to visibility impairment at the Class I areas in North Carolina. North Carolina considered agricultural and forestry smoke management techniques to address visibility impacts from elemental carbon. NCDAQ stated in its SIP that it is working with the North Carolina Division of Forest Resources to develop a smoke management program that utilizes basic smoke management practices and addresses the issues laid out in the EPA's 1998 *Interim Air Quality Policy on Wildland and Prescribed Fires* available at: <http://www.epa.gov/ttncaaa1/t1/memoranda/firefnl.pdf>. Additionally, NCDAQ is working with the North Carolina Department of Agriculture to develop a Memorandum of Understanding regarding agricultural burning.

With regard to fine soils, the State considered those activities that generate fugitive dust, including construction activities. With regard to construction activities, the North Carolina Department of Transportation's Division of Highways has issued regulations addressing control of erosion, siltation, and pollution from construction activities. In addition, NCDAQ promulgated state rule 15A NCAC 02D.0540, "Particulates From Fugitive Dust Emission Sources," effective on September 1, 2007, to control particulates from fugitive dust emissions sources generated within plant boundaries from activities such as "unloading and loading areas, process areas, stockpiles, stock pile working, plant parking lots, and plant roads (including access roads and haul roads)." The State has chosen not to develop controls for fine soils in this first implementation period because of their relatively minor contribution to visibility impairment.

With regard to ammonia emissions from agricultural sources, NCDAQ, as a continuation of the State's CSA, initiated the Climate Action Planning Advisory Group to develop options for the reduction of greenhouse gas emissions in North Carolina, including the emissions from agriculture and agricultural waste in North Carolina. The Group issued a report that supports expanded research, regulatory actions, and grant guarantees as key implementation tools to accomplish the expanded utilization of methane (a greenhouse gas) from hog/cattle waste for energy. The report also highlights improved waste management practices as important. A co-benefit of any resulting measures will be the reduction of ammonia emissions from animal waste. In addition, the North Carolina Legislature approved a bill on July 26, 2007, that permanently bans new lagoons at hog farms and orders state regulators to set environmental standards for new hog farm waste systems. The new legislation phases-out the use of waste lagoons by hog farmers, replacing them with more environmentally friendly systems.

EPA preliminarily concurs with the State's technical demonstration showing that elemental carbon, fine soils, and ammonia are not significant contributors to visibility in the State's Class I areas, and therefore, proposes to find that North Carolina has adequately satisfied 40 CFR 51.308(d)(3)(v). EPA's TSD to this Federal Register action and North Carolina's SIP provide more details on the State's consideration of these factors for North Carolina's LTS.

The emissions sensitivity analyses conducted by VISTAS predict that reductions in SO₂ emissions from EGU and non-EGU industrial point sources will result in the greatest improvements in visibility in the Class I areas in the VISTAS region, more than any other visibility-impairing pollutant. Specific to North Carolina, the VISTAS sensitivity analysis projects visibility benefits on the 20 percent worst days at the State's four inland Class I areas from SO₂ reductions from EGUs in eight of the 10 VISTAS states: Alabama, Georgia, Kentucky, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia. For the Swanquarter area, reductions from EGUs in North Carolina and South Carolina would have the greatest benefits; the contributions from other VISTAS states are comparatively small. Additional, smaller benefits are projected for North Carolina's Class I areas from SO₂ emissions reductions from non-utility industrial point sources in the VISTAS states. SO₂ emissions contributions to visibility impairment from other RPO regions are comparatively small in contrast to the VISTAS states' contributions, and thus, controlling sources outside of the VISTAS region is predicted to provide less significant improvements in visibility in the Class I areas in VISTAS.

Taking the VISTAS sensitivity analyses results into consideration, North Carolina concluded that reducing SO₂ emissions from EGU and non-EGU point sources in certain VISTAS states would have the greatest visibility benefits for the North Carolina Class I areas.

The State chose to focus solely on evaluating certain SO₂ sources contributing to visibility impairment to the State's Class I areas for additional emissions reductions for reasonable progress in this first implementation period (described in sections IV.C.4 and IV.C.5 of this action). EPA proposes to agree with the State's analyses and conclusions used to determine the pollutants and source categories that most contribute to visibility impairment in the North Carolina Class I areas, and proposes to find the State's approach to focus on developing a LTS that includes largely additional measures for point sources of SO₂ emissions to be appropriate.

SO₂ sources for which it is demonstrated that no additional controls are reasonable in this current implementation period will not be exempted from future assessments for controls in subsequent implementation periods or, when appropriate, from the five-year periodic SIP reviews. In future implementation periods, additional controls on these SO₂ sources evaluated in the first implementation period may be determined to be reasonable, based on a reasonable progress control evaluation, for continued progress toward natural visibility conditions for the 20 percent worst days and to avoid further degradation of the 20 percent best days. Similarly, in subsequent implementation periods, the State may use different criteria for identifying sources for evaluation and may consider other pollutants as visibility conditions change over time.

4. Procedure for Identifying Sources to Evaluate for Reasonable Progress Controls in North Carolina and Surrounding Areas

As discussed in section IV.C.3 of this action, through comprehensive evaluations by VISTAS and the Southern Appalachian Mountains Initiative (SAMI),¹² the VISTAS states

¹² Prior to VISTAS, the southern states cooperated in a voluntary regional partnership "to identify and recommend reasonable measures to remedy existing and prevent future adverse effects from human-induced air pollution on the air quality related values of the Southern Appalachian Mountains." States cooperated with FLMs, EPA, industry, environmental organizations, and academia to complete a technical assessment of the impacts of acid deposition,

concluded that sulfate particles resulting from SO₂ emissions account for the greatest portion of the regional haze affecting the Class I areas in VISTAS states, including those areas in North Carolina. Utility and non-utility boilers are the main sources of SO₂ emissions within the southeastern United States. VISTAS developed a methodology for North Carolina that enables the State to focus its reasonable progress analysis on those geographic regions and source categories that impact visibility at its Class I areas. Recognizing that there was neither sufficient time nor adequate resources available to evaluate all emissions units within a given area of influence (AOI) around each of the Class I areas that North Carolina's sources impact, the State established a threshold to determine which emissions units would be evaluated for reasonable progress control. In applying this methodology, NCDAQ first calculated the fractional contribution to visibility impairment from all emissions units within the SO₂ AOI for its Class I areas, and from those units within the SO₂ AOIs surrounding Class I areas in other states potentially impacted by emissions from emissions units in North Carolina. The State then identified those emissions units with a contribution of one percent or more to the visibility impairment at that particular Class I area, and evaluated each of these units for control measures for reasonable progress using the following four "reasonable progress factors" required under 40 CFR 51.308(d)(1)(i)(A): (i) cost of compliance; (ii) time necessary for compliance; (iii) energy and non-air quality environmental impacts of compliance; and (iv) remaining useful life of the emissions unit.

North Carolina's SO₂ AOI methodology captured greater than 60 percent of the total point source SO₂ contribution to visibility impairment in four of the five Class I areas in North Carolina, and required an evaluation of 21 emissions units at seven facilities in North Carolina.

ozone, and fine particles on sensitive resources in the Southern Appalachians. The SAMI Final Report was delivered in August 2002.

At the remaining Class I area, Swanquarter, the one percent threshold represents 47 percent of the total point source SO₂ contribution, while requiring an evaluation of 12 additional units at six facilities in North Carolina. The NCDAQ also looked at what sources in North Carolina may be impacting Class I areas located outside of the State, as well as what sources located outside of North Carolina may be impacting the North Carolina Class I areas. By applying the State's AOI SO₂ methodology, the only North Carolina source that was identified as potentially impacting visibility in a Class I area outside the State was the Duke Power - Dan River facility, which may impact the James River Face Wilderness Area in Virginia. To capture a higher percentage of emissions units contributing to the total sulfate visibility impairment would involve an evaluation of many more units that have substantially less impact.

NCDAQ believes that the one percent threshold is appropriate given the contribution to the total sulfate visibility impairment at each Class I area and the limited resources available to conduct a unit-by-unit evaluation for reasonable progress. EPA believes the approach developed by VISTAS and implemented for the Class I areas in North Carolina is a reasonable methodology to prioritize the most significant contributors to regional haze and to identify sources to assess for reasonable progress control. The approach is consistent with EPA's Reasonable Progress Guidance. The technical approach of VISTAS and North Carolina was objective and based on several analyses, including the evaluation of a large universe of emissions units within and surrounding the State of North Carolina and all of the 18 VISTAS Class I areas. It also included an analysis of the VISTAS emissions units affecting nearby Class I areas surrounding the VISTAS states that are located in other RPOs' Class I areas.

5. Application of the Four CAA factors in the Reasonable Progress Analysis

NCDAQ identified 34 emissions units at 14 facilities in North Carolina (see Table 4) with SO₂ emissions that were above the State's minimum threshold for reasonable progress evaluation because they were modeled to fall within the SO₂ AOI of any Class I area and have a one percent or greater contribution to the sulfate visibility impairment in at least one Class I area.¹³ Of these 34 units, seven emissions units were not subject to a reasonable progress analysis because they were already subject to BART or had shut down. In addition, as discussed in section IV.C.5.B, 16 units are subject to CAIR, and NCDAQ concluded that no additional controls for SO₂ beyond CAIR for subject EGUs are reasonable for this first implementation period. NCDAQ evaluated 11 units at five facilities.

Table 4: North Carolina Facilities with Emissions Units Subject to Reasonable Progress Analysis

Facilities With Emissions Unit(s) Subject to Reasonable Progress Analysis
Blue Ridge Paper Products - Canton Mill G-24, G-25, G-65, G-66
Cogentrix Kenansville - Gen1
PCS Phosphate Company Inc. - Aurora G-1034, G-1035
Weyerhaeuser Company - New Bern G-42
Weyerhaeuser Company - Plymouth G-140, G-143, G-148
Facilities With Unit(s) Found Not Subject to Reasonable Progress Analysis
<i>EGUs Subject to CAIR Within AOI of Any Class I Area</i>
Carolina Power & Light Asheville Steam E1, E2
Duke Energy Corporation - Buck Steam Station G-4, G-5
Duke Energy Corporation - Dan River Station G-21
Duke Energy Corporation - Cliffside Steam G-86, G-87, G-88
Duke Energy Corporation - Marshall Steam G-1, G-2
Duke Energy Corporation - Riverbend Steam G-17, G-19, G-20
L V Sutton Steam Electric Plant G-188

¹³ See also EPA's TSD, section III.C.2, fractional contribution analysis tables for each Class I area, excerpted from the North Carolina SIP, Appendix H.

Progress Energy - F Lee Plant G-2, G-3
<i>Emissions Units Subject to BART</i>
Blue Ridge Paper Products - Canton Mill G-26, G-31, G-32
<i>Emissions Units that Shut Down</i>
PCS Phosphate Company Inc. - Aurora G-1032, G-1033
Ecusta Business Development Center LLC - G-28, G-29

A. Facilities with Emissions Unit(s) Subject to Reasonable Progress Analysis

NCDAQ analyzed whether SO₂ controls should be required for 11 emissions units at five facilities based on a consideration of the four factors set out in the CAA and EPA's regulations. For the limited purpose of evaluating the cost of compliance for the reasonable progress assessment in this first regional haze SIP, NCDAQ believed that it was not equitable to require non-EGUs to bear a greater economic burden than EGUs for a given control strategy. The facility-by-facility costs for EGUs under CSA ranged from 912 to 1,922 dollars per ton of SO₂ removed (\$/ton SO₂), and the average costs per utility system ranged from \$1,231 to \$1,375/ton SO₂. These costs were estimated using the capital costs from the CSA 2006 compliance plans and the projected operating costs provided by Duke Energy and Progress Energy. These costs were used as a guide in determining cost effectiveness.

During the current reasonable progress assessment, no emissions units in North Carolina were identified for additional control since no measures were found to be below the cost threshold discussed above. NCDAQ did not perform an exhaustive review of the remaining three statutory factors for reasonable progress since it did not identify any cost-effective control measures for the specific sources with contributions to Class I areas in North Carolina or neighboring states. Neither the time necessary for compliance nor the energy and non-air quality environmental impacts of compliance appear to be out of the ordinary for the control measures identified for these facilities. A likely short remaining useful life for two units was noted in one

case, but a longer remaining useful life would not alter the reasonable progress determination for those units.

North Carolina also noted that, in order to show continued progress past 2018, the criteria will likely be different in the next reasonable progress assessment in order to maintain continuous visibility improvement toward natural background conditions by 2064. The facilities in North Carolina that have units that contribute at least one percent to visibility impairment at any Class I area in the State, or in neighboring states, were sent letters from NCDAQ indicating that while no additional controls were identified during this reasonable progress assessment, these sources will evaluate possible SO₂ reduction strategies for the next regional haze SIP due July 31, 2018.

1. Blue Ridge Paper Products

Four coal-fired Power Boilers at Blue Ridge Paper Products were evaluated for reasonable progress: No. 4 Power Boiler (G-66) with a capacity of 535 million British thermal units per hour (MMBtu/hr) and boilers G-24, G-25, and G-65, each with a capacity of 364 -399 MMBtu/hr. Boilers G-24, G-25, and G-65 burn a washed and blended coal from different portions of the coal seam at the Apollo mine to meet Blue Ridge Paper's specifications for heat, ash and sulfur content. Coal from the Apollo mine has high heat content, low to moderate ash, and low to moderate sulfur, and it averages from 1.4 to 1.5 pounds SO₂ per million British Thermal Units (lbs SO₂/MMBtu). The electrostatic precipitators (ESPs) on these boilers perform well on this moderate sulfur coal and test well below applicable PM standards. They are not designed, however, to burn low sulfur coal. Ash from low sulfur coal has a higher resistivity than ash from the moderate sulfur coal that Blue Ridge Paper burns in these boilers. The No. 4

Power Boiler burns washed, low sulfur coal subject to new source performance standards (NSPS) with a sulfur limit of 1.2 lbs SO₂/MMBtu.

Based on information from the company, this lower sulfur coal is \$75-90/ton SO₂, and the other coal used at the facility is \$65/ton SO₂. The cost difference is \$10-25/ton SO₂. The company burned 277,214 tons of higher sulfur coal in 2005; switching to lower sulfur coal would cost approximately \$2,772,140 - \$6,930,350 extra per year. If 1,400 tons of SO₂ were reduced by switching from the current higher sulfur coal (one percent sulfur or approximately 1.6 lb SO₂/MMBtu) to lower sulfur coal (0.75 percent sulfur or approximately 1.2 lb SO₂/MMBtu) at the 2005 rate of coal consumption, associated costs would range from \$1,980 - \$4,950/ton SO₂ with an average cost of \$3,465/ton SO₂. NCDAQ determined that the cost for add-on control technology for these units ranges from \$12,055 to \$100,961/ton SO₂. NCDAQ concluded that there are no cost-effective controls available for these units at this time within the cost threshold established for this reasonable progress assessment. Although NCDAQ has concluded that there are no cost-effective controls for this reasonable progress period, the State acknowledges that the emissions from Blue Ridge Paper Products impact North Carolina's inland Class I areas. NCDAQ notified the company that although additional controls are not required during this implementation period, the State may require the installation and operation of controls for future implementation periods. NCDAQ is committed to working with this company over the next review period and encouraging the company to modernize some of its processes with more efficient equipment with lower emissions.

2. PCS Phosphate

Two of the four sulfuric acid units at PCS Phosphate identified for further analysis under reasonable progress remain in operation (units 1034 and 1035). On February 7, 2011, NCDAQ provided a technical supplement to the December 17, 2007, regional haze SIP for these units. The two PCS Phosphate units currently utilize dual absorption systems with a vanadium catalyst. The four technologies reviewed included sodium bisulfite scrubbing, molecular sieve, ammonia scrubbing, and dual absorption process with cesium-promoted catalyst.

The first three technologies were rejected because they have not been commercially demonstrated to reliably meet current NSPS and state permit limits. The use of cesium-promoted catalyst was further evaluated, looking at three scenarios. The first scenario evaluated, changing to a cesium-promoted catalyst without making other major capital investments, was estimated to cost \$2,879/ton SO₂ and reduce SO₂ emissions by only 165 tons per year. This estimate was based on reducing SO₂ emissions from 3.8 to 3.5 lbs SO₂/ton of sulfuric acid produced. The other two scenarios evaluated meeting a 2.0 lbs SO₂/ton of sulfuric acid produced limit by either making operational changes or by modifying the reactor vessel. The operational changes could be made without significant capital expenditures but would significantly reduce production capacity. Modifying the unit to increase the amount of catalyst available required significant capital investment. NCDAQ estimated that these options would reduce SO₂ emissions by 2,073 tons/year with a cost effectiveness of approximately \$11,347/ton of SO₂ reduced for the operational change and a cost effectiveness of approximately \$12,816 to \$13,651/ton SO₂ for the unit modification. NCDAQ also cited modeling analyses which concluded that the visibility improvement at the Swanquarter Wilderness Area resulting from reducing the SO₂ emissions rate by 1.0 lb SO₂/ton sulfuric acid produced (i.e., a change in

emissions rate from 4.0 to 3.0 lbs SO₂/ton sulfuric acid produced) would only be 0.16 deciview. Therefore, NCDAQ concluded that there are no cost-effective controls available for these units at this time within the cost threshold established for this reasonable progress assessment. NCDAQ notified the company that although additional controls are not being required during this planning period, the State may require the installation and operation of controls for future-planning periods.

3. Weyerhaeuser - Plymouth

Weyerhaeuser - Plymouth has three power boilers subject to analysis: Riley No. 1 Combination Boiler, No. 1 Hog Fuel Boiler, and No. 2 Hog Fuel Boiler. The Riley No. 1 Combination Boiler burns coal, No. 6 fuel oil, Low Volume High Concentration (LVHC) gases, and Stripper Off Gas (SOG) gases and is fired at 624 MMBtu/hr maximum heat input. The No. 1 Hog Fuel Boiler burns hog fuel (wood waste), No. 6 fuel oil, coal, used oil, sludge, and High Volume Low Concentration (HVLC) gases. This boiler is fired at 835 MMBtu/hr maximum heat input from hog fuel, 617 MMBtu/hr maximum heat input from No. 6 fuel oil, or for combination firing, 701.2 and 319.8 MMBtu/hr maximum heat input from hog fuel and coal, respectively. The No. 2 Hog Fuel Boiler burns hog fuel, No. 6 fuel oil, coal, used oil, sludge, HVLC, LVHC, and SOG gases. It is fired at 889 MMBtu/hr maximum heat input from combined fuels or 800 MMBtu/hr maximum heat input from No. 6 fuel oil.

NCDAQ did not identify any available controls for the Hog Boiler 1 or 2. For the Riley Boiler, the only available control that NCDAQ identified is a flue gas desulfurization (FGD) scrubber at a cost of \$20,460/ton SO₂. Therefore, NCDAQ concluded that there are no cost-

effective controls for these units at this time within the cost threshold established for this reasonable progress assessment.

4. Weyerhaeuser - New Bern

Weyerhaeuser - New Bern has one power boiler which burns residual oil. It is fired at 579 MMBtu/hr maximum heat input rate. The only available control identified by NCDAQ is an FGD at a cost of \$17,317/ton SO₂. Therefore, the NCDAQ concluded that there are no cost-effective controls available for this unit at this time within the cost threshold established for this reasonable progress assessment.

5. Cogentrix Kenansville

The affected emissions unit at Cogentrix Kenansville is Gen1, a 215 MMBtu/hr heat input mixed fuel-fired EGU capable of burning coal, natural gas, No. 2 and No. 4 fuel oil, tire-derived fuel, pelletized paper fuel, flyash briquette, and wood. Although the company retains coal as a permitted fuel on the permit, it is currently burning unadulterated wood (pure wood with up to five percent impurities), and its new business plan is to continue burning only wood as part of the “green power” movement in North Carolina.

The 2005 actual SO₂ emissions for this unit were 23.25 tons, whereas the projected 2018 SO₂ emissions were 1,833.8 tons based on using coal. In the final SIP submittal, the NCDAQ stated that it is sending the company a letter indicating that they are currently on the list of sources contributing greater than one percent to the total sulfate visibility impairment at the Swanquarter Wilderness Area based on the estimated emissions from burning coal. The SIP

submittal indicated that the letter will suggest that the facility change its permit to remove coal as a possible fuel source for this unit.

6. EPA Assessment

As noted in EPA's Reasonable Progress Guidance, the states have wide latitude to determine appropriate additional control requirements for ensuring reasonable progress, and there are many ways for a state to approach identification of additional reasonable measures. States must consider, at a minimum, the four statutory factors in determining reasonable progress, but states have flexibility in how to take these factors into consideration.

NCDAQ applied the methodology developed by VISTAS for identifying appropriate sources to be considered for additional controls under reasonable progress for the implementation period ending in 2018 that is addressed by this SIP. Using this methodology, NCDAQ first identified those emissions and emissions units most likely to have an impact on visibility in the State's and neighboring Class I areas. Units with emissions of SO₂ with a relative contribution to visibility impairment of at least a one percent contribution at any Class I area were then subject to a reasonable progress control analysis except for utilities subject to CAIR.

After reviewing NCDAQ's methodology and analyses and the record prepared by NCDAQ, EPA proposes to find North Carolina's conclusion that no further controls are necessary at this time acceptable. EPA proposes to find that North Carolina adequately evaluated the control technologies available at the time of its analysis and applicable to this type of facility and consistently applied its criteria for reasonable compliance costs. The State also included appropriate documentation in its SIP of the technical analysis it used to assess the need

for and implementation of reasonable progress controls. Although the use of a specific threshold for assessing costs means that a state may not fully consider available emissions reduction measures above its threshold that would result in meaningful visibility improvement, EPA believes that the North Carolina SIP still ensures reasonable progress. In proposing to approve North Carolina's reasonable progress analysis, EPA is placing great weight on the fact that there is no indication in the SIP submittal that North Carolina, as a result of using a specific cost effectiveness threshold, rejected potential reasonable progress measures that would have had a meaningful impact on visibility in its Class I areas. EPA notes that given the emissions reductions resulting from CAIR and the measures in nearby states, the visibility improvements projected for the affected Class I areas are in excess of that needed to be on the uniform rate of progress.

B. Facilities With Emissions Units Subject to CAIR Within AOI of Any Class I Area

NCDAQ identified 16 EGUs at eight facilities which met the State's minimum threshold for reasonable progress evaluation because they were modeled to fall within the SO₂ AOI of any Class I area and have a one percent or greater contribution to the sulfate visibility impairment to at least one Class I area. North Carolina determined that no additional controls for the State's EGUs for SO₂ were reasonable during the first implementation period. In reaching this decision, NCDAQ evaluated the amount of SO₂ emissions reductions from the EGU sector expected from the implementation of North Carolina's CSA and CAIR. The EGUs in North Carolina are expected to reduce their SO₂ emissions by greater than 80 percent between 2002 and 2018.

Additionally, NCDAQ considered the four reasonable progress factors set forth in EPA's RHR as they apply to the State's entire EGU sector in sections 7.7 and 7.8 of the North Carolina

SIP. In particular, the State took into account the factors of cost and time necessary for compliance in view of EPA's analysis supporting CAIR.

Based on this analysis, NCDAQ concluded that the emissions reductions required by CAIR constitute reasonable measures for North Carolina EGUs during this first assessment period. This conclusion is bolstered by the fact that, as discussed in section IV.C.7, visibility improvement at the State's Class I areas is projected to exceed the uniform rate of progress in this first implementation period. NCDAQ intends to re-evaluate EPA's Integrated Planning Model (IPM) predictions of SO₂ emissions reductions for CAIR at the time of the next periodic progress report to ensure that the reductions are in fact taking place where they were predicted. Based on the controls required by CSA, and predicted by IPM under CAIR, NCDAQ has concluded that, at this time, these existing regulatory programs constitute reasonable control measures for these 16 EGUs during the first implementation period (between the baseline and 2018). EPA proposes a limited approval of North Carolina's methodology and determination that no additional controls beyond CAIR and CSA are reasonable for SO₂ for affected North Carolina EGUs for the first implementation period.

C. Facilities With Unit(s) Found Not Subject to Reasonable Progress Analysis

1. Non-EGUs Subject to BART

Three emissions units at Blue Ridge Paper that met the State's minimum threshold for a reasonable progress control evaluation are emissions units that NCDAQ also found to be subject to BART. NCDAQ concluded that the application of BART constitutes reasonable progress for these three units for this implementation period, and thus, it is not requiring any additional controls for reasonable progress at this time. As discussed in EPA's Reasonable Progress

Guidance, since the BART analysis is based, in part, on an assessment of many of the same factors that must be addressed in establishing the RPGs, EPA believes that it is reasonable to conclude that any control requirements imposed in the BART determination also satisfy the RPG-related requirements for source review in the first implementation period.¹⁴ Thus, EPA proposes to concur with the State's conclusions that BART satisfies reasonable progress for the first implementation period for these three emissions units at Blue Ridge Paper.

2. Other Units Exempted from Preparing a Reasonable Progress Control Analysis

NCDAQ did not evaluate the two emissions units at Ecusta Business Development Center since they ceased operation prior to the regional haze SIP submittal date. Two of the four units at PCS Phosphate in Aurora that were identified for assessment for reasonable progress have since permanently ceased operation and therefore were not evaluated further.

6. BART

BART is an element of North Carolina's LTS for the first implementation period. The BART evaluation process consists of three components: (a) an identification of all the BART-eligible sources, (b) an assessment of whether the BART-eligible sources are subject to BART and (c) a determination of the BART controls. These components, as addressed by NCDAQ and NCDAQ's findings, are discussed as follows.

A. BART-Eligible Sources

The first phase of a BART evaluation is to identify all the BART-eligible sources within the State's boundaries. NCDAQ identified the BART-eligible sources in North Carolina by

¹⁴ EPA's Reasonable Progress Guidance, pages 4.2-4-3.

utilizing the three eligibility criteria in the BART Guidelines (70 FR 39158) and EPA's regulations (40 CFR 51.301): (1) one or more emissions units at the facility fit within one of the 26 categories listed in the BART Guidelines; (2) the emissions units were not in operation prior to August 7, 1962, and were in existence on August 7, 1977; and (3) these units have the potential to emit 250 tons or more per year of any visibility-impairing pollutant.

The BART Guidelines also direct states to address SO₂, NO_x, and direct PM (including both PM₁₀ and PM_{2.5}) emissions as visibility-impairment pollutants and to exercise judgment in determining whether VOC or ammonia emissions from a source impair visibility in a Class I area. *See* 70 FR 39160. VISTAS modeling demonstrated that VOC from anthropogenic sources and ammonia from point sources, except for potentially one ammonia source, are not significant visibility-impairing pollutants in North Carolina, as discussed in section IV.C.3 of this action. Based on the VISTAS modeling, NCDAQ has determined that ammonia emissions from the State's point sources are not anticipated to cause or contribute significantly to any impairment of visibility in Class I areas and should be exempt for BART purposes. No ammonia source in North Carolina was identified by VISTAS as a possible contributor to visibility impairment.

B. BART-Subject Sources

The second phase of the BART evaluation is to identify those BART-eligible sources that may reasonably be anticipated to cause or contribute to visibility impairment at any Class I area, i.e., those sources that are subject to BART. The BART Guidelines allow states to consider exempting some BART-eligible sources from further BART review because they may not reasonably be anticipated to cause or contribute to any visibility impairment in a Class I area. Consistent with the BART Guidelines, North Carolina required each of its BART-eligible

sources to develop and submit dispersion modeling to assess the extent of their contribution to visibility impairment at Class I areas in surrounding states.

1. Modeling Methodology

The BART Guidelines allow states to use the CALPUFF¹⁵ modeling system (CALPUFF) or another appropriate model to predict the visibility impacts from a single source on a Class I area and therefore, to determine whether an individual source is anticipated to cause or contribute to impairment of visibility in Class I areas, i.e., “is subject to BART.” EPA believes that CALPUFF is the best regulatory modeling application currently available for predicting a single source’s contribution to visibility impairment (70 FR 39162). North Carolina, in coordination with VISTAS, used the CALPUFF modeling system to determine whether individual sources in North Carolina were subject to BART.

The BART Guidelines also recommend that states develop a modeling protocol for making individual source attributions and suggest that states may want to consult with EPA and their RPO to address any issues prior to modeling. The VISTAS states, including North Carolina, developed a “Protocol for the Application of CALPUFF for BART Analyses.” Stakeholders, including EPA, FLMs, industrial sources, trade groups, and other interested parties, actively participated in the development and review of the VISTAS protocol.

VISTAS developed a post-processing approach to use the new IMPROVE equation with the CALPUFF model results so that the BART analyses could consider the old and new

¹⁵ Note that EPA’s reference to CALPUFF encompasses the entire CALPUFF modeling system, which includes the CALMET, CALPUFF, and CALPOST models and other pre and post processors. The different versions of CALPUFF have corresponding versions of CALMET, CALPOST, etc. which may not be compatible with previous versions (e.g., the output from a newer version of CALMET may not be compatible with an older version of CALPUFF). The different versions of the CALPUFF modeling system are available from the model developer on the following website: <http://www.src.com/verio/download/download.htm>.

IMPROVE equations. North Carolina's justification included a method to process the CALPUFF output and a rationale on the benefits of using the new IMPROVE equation.

2. Contribution Threshold

For states using modeling to determine the applicability of BART to single sources, the BART Guidelines note that the first step is to set a contribution threshold to assess whether the impact of a single source is sufficient to cause or contribute to visibility impairment at a Class I area. The BART Guidelines state that “[a] single source that is responsible for a 1.0 deciview change or more should be considered to ‘cause’ visibility impairment.” The BART Guidelines also state that “the appropriate threshold for determining whether a source ‘contributes to visibility impairment’ may reasonably differ across states,” but, “[a]s a general matter, any threshold that you use for determining whether a source ‘contributes’ to visibility impairment should not be higher than 0.5 deciviews.” The Guidelines affirm that states are free to use a lower threshold if they conclude that the location of a large number of BART-eligible sources in proximity of a Class I area justifies this approach.

North Carolina used a contribution threshold of 0.5 deciview for determining which sources are subject to BART. NCDAQ concluded that, considering the results of the visibility impacts modeling conducted, a 0.5 deciview threshold was appropriate in this situation and a lower threshold was not warranted for the following reasons. The State demonstrated that there are a limited number of in and out of state sources that impact the Class I areas in the State, and that there are a limited number of sources in close proximity to each of the affected Class I areas. Additionally, the majority of the visibility impacts were well below 0.5 deciview. Also, even though several sources impacted each Class I area, the overall impacts were low from the

sources. EPA is proposing to agree with North Carolina that the overall impacts of these sources are not sufficient to warrant a lower contribution threshold and that a 0.5 deciview threshold was appropriate in this instance.

3. Identification of Sources Subject to BART

North Carolina identified 17 facilities with BART-eligible sources. All of North Carolina's 17 BART-eligible sources were required by the State to submit exemption-modeling demonstrations. North Carolina found that two of its BART-eligible sources (Blue Ridge Paper and PCS Phosphate) had modeled visibility impacts of more than the State's 0.5 deciview threshold. Therefore, these two facilities are subject to BART and submitted State permit applications including their proposed BART determinations. PCS Phosphate subsequently shut down its two sulfuric acid units subject to BART and these units were not further evaluated.

The 15 remaining sources were able to demonstrate that they are not subject to BART by modeling less than a 0.5 deciview visibility impact at the affected Class I areas. This modeling involved emissions of NO_x, SO₂, and PM₁₀ as applicable to individual facilities.

Six of North Carolina's BART-eligible sources are facilities with EGUs that are subject to CAIR. As noted above, the RHR allows states to implement an alternative program in lieu of BART so long as the alternative program can be demonstrated to achieve greater reasonable progress toward the national visibility goal than would BART. Under regulations issued in 2005 revising the regional haze program, EPA made just such a demonstration for CAIR. *See* 70 FR 39104 (July 6, 2005). EPA's regulations provide that states participating in the CAIR cap-and-trade program under 40 CFR part 96 pursuant to an EPA-approved CAIR SIP or which remain subject to the CAIR Federal Implementation Plan in 40 CFR part 97 need not require affected

BART-eligible EGUs to install, operate, and maintain BART for emissions of SO₂ and NO_x.

See 40 CFR 51.308(e)(4). Because CAIR did not address direct emissions of PM, states were still required to conduct a BART analysis for PM emissions from EGUs subject to BART for that pollutant. Thus, North Carolina's EGUs were allowed to submit BART exemption modeling demonstrations for PM emissions only. All of the BART-eligible EGUs demonstrated that their PM emissions do not contribute to visibility impairment in any Class I area. Table 5 identifies the 17 BART-eligible sources located in North Carolina.

Table 5: North Carolina BART-Eligible and Subject-to-BART Sources

Facilities With Unit(s) Subject to BART	
	Blue Ridge Paper
Facilities With Unit(s) Not Subject to BART	
	<i>EGU CAIR and BART Modeling (PM only) Exempt Sources¹⁶</i>
	Duke Energy – Belews Creek Steam Station
	Duke Energy – Cliffside Steam Station
	Duke Energy – Marshall Steam Station
	Progress Energy – Asheville Plant
	Progress Energy – Roxboro Steam Electric Plant
	Progress Energy – Sutton Plant
	<i>Non-EGU BART Modeling Exempt</i>
	Alcoa, Inc.-Badin Works
	DAK Americas – Cape Fear
	DAK Americas – Cedar Creek
	Elementis Chromium
	International Paper – Riegelwood Mill
	International Paper – Roanoke Rapids
	Invista, S.A.R.L.
	Weyerhaeuser Company – Plymouth
	Weyerhaeuser Company – New Bern
	<i>Shut Down</i>
	PCS Phosphate

¹⁶ EGUs were only evaluated for PM emissions. North Carolina relied on CAIR to satisfy BART for SO₂ and NO_x for its EGUs in CAIR, in accordance with 40 CFR 51.308(e)(4). Thus, SO₂ and NO_x were not analyzed.

Prior to the CAIR remand, the State's reliance on CAIR to satisfy BART for NO_x and SO₂ for affected CAIR EGUs was fully approvable and in accordance with 40 CFR 51.308(e)(4). However, the BART assessments for CAIR EGUs for NO_x and SO₂ and other provisions in this SIP revision are based on CAIR. In a separate action, EPA has proposed a limited disapproval of the North Carolina regional haze SIP because of deficiencies in the State's regional haze SIP submittal arising from the remand by the D.C. Circuit to EPA of CAIR. *See* 76 FR 82219. Consequently, EPA is not taking action in this proposed rulemaking to address the State's reliance on CAIR to meet certain regional haze requirements.

C. BART Determination

The five BART-eligible units at Blue Ridge Paper modeled visibility impacts of more than the 0.5 deciview threshold and are therefore subject to BART. Consequently, Blue Ridge Paper submitted to the State a permit application that included their proposed BART determination.

In accordance with the BART Guidelines, to determine the level of control that represents BART for each source, the State first reviewed existing controls on these units to assess whether these constituted the best controls currently available, then identified what other technically feasible controls are available, and finally, evaluated the technically feasible controls using the five BART statutory factors. The State's evaluations and conclusions, and EPA's assessment, are summarized below. The units subject to the BART requirements at Blue Ridge Paper include the two recovery furnaces, their associated smelt dissolving tanks, and the black liquor oxidation system (BLOX). NCDAQ concluded that BART for all of these emissions sources is the existing emissions control systems currently in place.

The recovery furnaces emit PM, SO₂, and NO_x. For the recovery furnaces, potential retrofit control technologies for PM emissions were not further evaluated since the units are already equipped with the most stringent controls and since the operation of these controls is required by the facility's title V operating permit. For NO_x, several potential control alternatives were evaluated; however, NCDAQ believes that the installation of NO_x reduction controls for the recovery furnaces is not economically feasible. For SO₂, installation of a wet scrubber following the ESP was identified as technically feasible; however, it was not considered economically feasible and would result in only a marginal visibility improvement at one Class I area (Great Smoky Mountains) and degradation in visibility at another (Shining Rock). Therefore, the State determined that retrofit controls are not warranted as BART for SO₂ emissions from the recovery furnaces.

The smelt dissolving tanks emit PM, SO₂, and NO_x. No NO_x controls are available for this source type. For PM and SO₂, the number of technically feasible controls is limited due to the fact that the emissions are minimal and of low velocity. Although several options were evaluated, they would only minimally reduce the number of days above 0.5 deciview at Shining Rock and Great Smoky Mountains, and NCDAQ believes that the installation of retrofit controls on the smelt dissolving tanks as BART is not economically feasible (in excess of \$13,000/ton for less than 44 tons/year of particulate reduction).

The BLOX system emits PM, SO₂ and NO_x. Blue Ridge is complying with MACT Subpart S through alternative requirements approved by the EPA under an equivalency by permit approach. Under these alternative requirements, Blue Ridge is controlling the BLOX system to achieve a greater level of hazardous air pollutant (HAP) reduction by controlling emissions from the BLOX system in a new Regenerative Thermal Oxidizer (RTO) equipped with a wet scrubber

for SO₂ control. Proper operation of the RTO and combustion of natural gas as auxiliary fuel minimize PM and NO_x emissions.

Because the unit is already equipped with the most stringent controls as required by the MACT standards, and permit limits are in place to ensure these controls are operated properly, the NCDAQ has determined that BART for the BLOX is existing controls.

EPA proposes to agree with North Carolina's analyses and conclusions for the BART emissions units located at the Blue Ridge Paper facility. EPA has reviewed the North Carolina analyses and proposes to conclude that they were conducted in a manner that is consistent with EPA's BART Guidelines and EPA's *Air Pollution Control Cost Manual* (<http://www.epa.gov/ttn/catc1/products.html#cccinfo>). Therefore, the conclusions reflect a reasonable application of EPA's guidance to these sources.

7. RPGs

The RHR at 40 CFR 51.308(d)(1) requires states to establish RPGs for each Class I area within the state (expressed in deciviews) that provide for reasonable progress towards achieving natural visibility. VISTAS modeled visibility improvements under existing federal and state regulations for the period 2004-2018 and additional control measures which the VISTAS states planned to implement in the first implementation period. At the time of VISTAS modeling, some of the other states with sources potentially impacting visibility at the North Carolina Class I areas had not yet made final control determinations for BART and/or reasonable progress, and thus, these controls were not included in the modeling submitted by North Carolina. Any controls resulting from those determinations will provide additional emissions reductions and resulting visibility improvement, which give further assurances that North Carolina will achieve

its RPGs. This modeling demonstrates that the 2018 base control scenario provides for an improvement in visibility better than the uniform rate of progress for both of the North Carolina Class I areas for the most impaired days over the period of the implementation plan and ensures no degradation in visibility for the least impaired days over the same period.

On February 16, 2010, NCDAQ sent a letter to EPA Region 4 clarifying the reason for the differences in the RPGs for Great Smoky Mountains and Joyce Kilmer presented in the North Carolina and Tennessee regional haze SIP submittals. For the 20 percent worst days, the April 4, 2008, Tennessee submittal used 23.50 deciviews while the North Carolina submittal states the RPG as 23.7 (or 23.66) deciviews. (Similarly, for the 20 percent best days, the RPG differences between the two states' submittals were 12.2 (or 12.15) deciviews in the North Carolina submittal vs 12.11 deciviews in the Tennessee submittal.) NCDAQ explained that the differences are due to different modeling runs used by each state. At the time of SIP development, only the earlier version of the VISTAS modeling run was available to NCDAQ. NCDAQ acknowledges that the RPGs in the Tennessee regional haze SIP represent the most current information and commits to revise the RPGs for Great Smoky Mountains and Joyce Kilmer in the periodic progress report SIP. In accordance with this letter of clarification, Table 6 below reflects the updated RPGs of 12.11 (approximated to 12.1) and 23.50 for both the best and worst days, respectively, for these two Class I areas.

As shown in Table 6 below, North Carolina's RPGs for the 20 percent worst days provide greater visibility improvement by 2018 than the uniform rate of progress for the State's Class I areas. Also, the RPGs for the 20 percent best days provide greater visibility improvement by 2018 than current best day conditions. The regional haze provisions specify that a state may not adopt a RPG that represents less visibility improvement than is expected to result from other

CAA requirements during the implementation period. 40 CFR 51.308(d)(1)(vi). Therefore, the CAIR states with Class I areas, like North Carolina, took into account emissions reductions anticipated from CAIR in determining their 2018 RPGs.¹⁷ The modeling supporting the analysis of these RPGs is consistent with EPA guidance at the time.

Table 6: North Carolina 2018 RPGs (in deciviews)

Class I Area	Baseline Visibility - 20% Worst Days	2018 RPG - 20% Worst Days (Improvement from Baseline)	Uniform Rate of Progress at 2018 - 20% Worst Days	Baseline Visibility - 20% Best Days	2018 RPG - 20% Best Days (Improvement from Baseline)
Great Smoky Mountains National Park	30.3	23.5 (6.8)	25.79	13.6	12.1 (1.5)
Joyce Kilmer-Slickrock Wilderness Area	30.3	23.5 (6.8)	25.79	13.6	12.1 (1.5)
Linville Gorge Wilderness Area	28.8	22.0 (6.8)	24.67	11.1	9.6 (1.5)
Shining Rock Wilderness Area	28.5	22.1 (6.4)	24.50	7.7	6.9 (0.8)
Swanquarter Wilderness Area	24.7	20.4 (4.3)	21.66	12.0	11.0 (1.0)

The RPGs for the Class I areas in North Carolina are based on modeled projections of future conditions that were developed using the best available information at the time the analysis was done. These projections can be expected to change as additional information regarding future conditions becomes available. For example, new sources may be built, existing

¹⁷ Many of the CAIR states without Class I areas similarly relied on CAIR emissions reductions within the state to address some or all of their contribution to visibility impairment in other states' Class I areas, which the impacted Class I area state(s) used to set the RPGs for their Class I area(s). Certain surrounding non-CAIR states also relied on reductions due to CAIR in nearby states to develop their regional haze SIP submittals.

sources may shut down or modify production in response to changed economic circumstances, and facilities may change their emissions characteristics as they install control equipment to comply with new rules. It would be both impractical and resource-intensive to require a state to continually adjust its RPGs every time an event affecting these future projections changed.

EPA recognized the problems of a rigid requirement to meet a long-term goal based on modeled projections of future visibility conditions and addressed the uncertainties associated with RPGs in several ways. EPA made clear in the RHR that the RPG is not a mandatory standard which must be achieved by a particular date. *See* 64 FR 35733. At the same time, EPA established a requirement for a midcourse review and, if necessary, correction of the states' regional haze plans. *See* 40 CFR 52.308(g). In particular, the RHR calls for a five-year progress review after submittal of the initial regional haze plan. The purpose of this progress review is to assess the effectiveness of emissions management strategies in meeting the RPGs and to provide an assessment of whether current implementation strategies are sufficient for the state or affected states to meet their RPGs. If a state concludes, based on its assessment, that the RPGs for a Class I area will not be met, the RHR requires the state to take appropriate action. *See* 40 CFR 52.308(h). The nature of the appropriate action will depend on the basis for the state's conclusion that the current strategies are insufficient to meet the RPGs. North Carolina specifically committed to follow this process in its submittal. Accordingly, EPA proposes to approve North Carolina's RPGs for Great Smoky Mountains, Joyce Kilmer, Linville Gorge, Shining Rock, and Swanquarter.

D. Coordination of RAVI and Regional Haze Requirements

EPA's visibility regulations direct states to coordinate their RAVI LTS and monitoring provisions with those for regional haze, as explained in sections III.F and III.G of this action. Under EPA's RAVI regulations, the RAVI portion of a state SIP must address any integral vistas identified by the FLMs pursuant to 40 CFR 51.304. *See* 40 CFR 51.302. An *integral vista* is defined in 40 CFR 51.301 as a "view perceived from within the mandatory Class I Federal area of a specific landmark or panorama located outside the boundary of the mandatory Class I Federal area." Visibility in any mandatory Class I area includes any integral vista associated with that area. The FLMs did not identify any integral vistas in North Carolina. In addition, the Class I areas in North Carolina are neither experiencing RAVI nor are any of its sources affected by the RAVI provisions. Thus, the December 17, 2007, North Carolina regional haze SIP submittal does not explicitly address the two requirements regarding coordination of the regional haze with the RAVI LTS and monitoring provisions. North Carolina has, however, previously made a commitment to address RAVI should the FLMs certify visibility impairment from an individual source.¹⁸ EPA finds that this regional haze submittal appropriately supplements and augments North Carolina's RAVI visibility provisions to address regional haze by updating the monitoring and LTS provisions as summarized below in this section.

In its December 17, 2007, submittal, NCDAQ updated its visibility monitoring program and developed a LTS to address regional haze. Also in this submittal, NCDAQ affirmed its commitment to complete items required in the future under EPA's RHR. Specifically, NCDAQ made a commitment to review and revise its regional haze implementation plan and submit a plan revision to EPA by July 31, 2018, and every 10 years thereafter. *See* 40 CFR 51.308(f). In

¹⁸North Carolina submitted its visibility SIP revisions addressing RAVI on April 15, 1985, which EPA approved on January 21, 1986 (51 FR 2695).

accordance with the requirements listed in 40 CFR 51.308(g) of EPA's regional haze regulations and 40 CFR 51.306(c) of the RAVI LTS regulations, NCDAQ committed to submitting a report to EPA on progress towards the RPGs for each mandatory Class I area located within North Carolina and for each mandatory Class I area located outside North Carolina that may be affected by emissions from within North Carolina. The progress report is required to be in the form of a SIP revision and is due every five years following the initial submittal of the regional haze SIP. *See* 40 CFR 51.308(g). Consistent with EPA's monitoring regulations for RAVI and regional haze, North Carolina will rely on the IMPROVE network for compliance purposes, in addition to any RAVI monitoring that may be needed in the future. *See* 40 CFR 51.305, 40 CFR 51.308(d)(4). Also, the North Carolina new source review (NSR) rules, previously approved in the State's SIP, continue to provide a framework for review and coordination with the FLMs on new sources and major modifications to existing sources subject to the NSR regulations which may have an adverse impact on visibility in either form (i.e., RAVI and/or regional haze) in any Class I area.

E. Monitoring Strategy and Other Implementation Plan Requirements

The primary monitoring network for regional haze in North Carolina is the IMPROVE network. As discussed in section IV.B.2 of this notice, the following Class I areas in North Carolina have IMPROVE monitoring sites: Linville Gorge, Shining Rock, and Swanquarter. There is also one IMPROVE site in Tennessee that serves as the monitoring site for both Great Smoky Mountains and Joyce Kilmer, both of which lie partly in Tennessee and partly in North Carolina.

IMPROVE monitoring data from 2000-2004 serves as the baseline for the regional haze program, and is relied upon in the December 17, 2007, regional haze submittal. Data produced by the IMPROVE monitoring network will be used nearly continuously for preparing the five-year progress reports and the 10-year SIP revisions, each of which relies on analysis of the preceding five years of data. The Visibility Information Exchange Web System (VIEWS) web site has been maintained by VISTAS and the other RPOs to provide ready access to the IMPROVE data and data analysis tools. North Carolina is encouraging VISTAS and the other RPOs to maintain the VIEWS or a similar data management system to facilitate analysis of the IMPROVE data.

In addition to the IMPROVE measurements, there is long-term limited monitoring by FLMs which provides additional insight into progress toward regional haze goals. Such measurements include:

- Web cameras operated by the National Park Service at Look Rock, Tennessee, and Purchase Knob, North Carolina, in Great Smoky Mountains, and by the U.S. Forest Service at Frying Pan Mountain in Shining Rock.
- An integrating nephelometer for continuously measuring light scattering, operated by the National Park Service at Look Rock, Tennessee.
- A Tapered Element Oscillating Microbalance for continuously measuring $PM_{2.5}$ mass concentration, operated by the National Park Service at Look Rock, Tennessee.

Additional haze-related measurements were made in North Carolina in 2002-2005 to better understand source contributions to $PM_{2.5}$ mass and visibility. These studies included continuous monitoring of sulfate, nitrate, and carbon to better understand daily trends in $PM_{2.5}$, detailed analyses of carbon collected on filters to identify source contributions to carbon, and

additional analyses of sodium and ammonium on IMPROVE filter samples. While funding no longer exists to continue these special studies, VISTAS transferred the monitoring equipment to NCDAQ.

In the regional haze submittal, the State notes that NCDAQ will continue to operate the following monitors to further the understanding of both $PM_{2.5}$ as well as visibility formation and trends in North Carolina for as long as funds allow:

- Continuous nitrate monitor and continuous sulfate monitor at the Millbrook monitoring site in Raleigh, North Carolina;
- Continuous nitrate monitor at the Rockwell monitoring site in Rowan County, North Carolina, with a continuous sulfate monitor planned for this site as of January 2008;
- 5400 R&P monitor for organic, total, and elemental carbon at the Millbrook site; and
- Aethalometer (whose final location was yet to be determined at time of SIP development).

In addition, NCDAQ and the local air agencies in the State operate a comprehensive $PM_{2.5}$ network of the filter-based federal reference method monitors, continuous mass monitors, filter-based speciated monitors, and the continuous speciated monitors described above.

F. Consultation with States and FLMs

1. Consultation with Other States

In December 2006 and May 2007, the State Air Directors from the VISTAS states held formal interstate consultation meetings. The purpose of these meetings was to discuss the methodology proposed by VISTAS for identifying sources to evaluate for reasonable progress.

The states invited FLM and EPA representatives to participate and to provide additional feedback. The Directors discussed the results of analyses showing contributions to visibility impairment from states to each of the Class I areas in the VISTAS region.

NCDAQ evaluated the impact of North Carolina sources on Class I areas in neighboring states. The state in which a Class I area is located is responsible for determining which sources, both inside and outside of that state, to evaluate for reasonable progress controls. Because many of these states had not yet defined their criteria for identifying sources to evaluate for reasonable progress, North Carolina applied its AOI methodology to identify sources in the State that have emissions units with impacts large enough to potentially warrant further evaluation and analysis. The State identified one emissions unit in North Carolina with a contribution of one percent or more to the visibility impairment at the following Class I area in a neighboring state: James River Face Wilderness Area, Virginia. North Carolina also identified two emissions units that impact the shared Class I areas located in both North Carolina and Tennessee (Great Smoky Mountains and Joyce Kilmer). Based on an evaluation of the four reasonable progress statutory factors, North Carolina determined that there are no additional control measures for these North Carolina emissions units that would be reasonable to implement to mitigate visibility impacts in the Class I areas in these neighboring states. NCDAQ consulted with these states regarding its reasonable progress control evaluations showing no cost-effective controls available for those emissions units in North Carolina contributing at least one percent to visibility impairment at Class I areas in the states. Additionally, NCDAQ sent letters to other states in the VISTAS region, specifically Alabama, Georgia, and South Carolina, documenting its analysis using the State's AOI methodology that no SO₂ emissions units in North Carolina contribute at least one percent to the visibility impairment at the Class I areas in those states. No adverse comments

were received from the other VISTAS states. The documentation for these formal consultations is provided in Appendix J of North Carolina's SIP.

Regarding the impact of sources outside of the State on Class I areas in North Carolina, NCDAQ sent letters to Alabama, Delaware, Georgia, South Carolina, Tennessee, and Virginia pertaining to emissions units within these states that the State believes contributed one percent or higher to visibility impairment in the North Carolina Class I areas. At that time, these neighboring states were still in the process of evaluating BART and reasonable progress for their sources. Any controls resulting from those determinations will provide additional emissions reductions and resulting visibility improvement, which give further assurances that North Carolina will achieve its RPGs. Therefore, to be conservative, North Carolina opted not to rely on any additional emissions reductions from sources located outside the State's boundaries beyond those already identified in the State's regional haze SIP submittal and as discussed in section IV.C.1 of this action.

North Carolina also received letters from the Mid-Atlantic/Northeast Visibility Union (MANE-VU) RPO states of Maine, New Jersey, and New Hampshire in early 2007 stating that based on MANE-VU's analysis of 2002 emissions data, North Carolina contributed to visibility impairment at Class I areas in those states. These letters invited North Carolina to participate in future consultation meetings. North Carolina sent response letters to these states providing information on the State's CSA and copies of the compliance plans for two utilities in the State showing which emissions units are expected to install controls to meet CSA NO_x and SO₂ emissions caps. North Carolina emphasized in its response letters that it is important to also evaluate visibility impairment contributions for the year 2018 to reflect implementation of programs such as CAIR and CSA. NCDAQ noted that based upon VISTAS' analyses using

2018 emissions projections, no emissions units in North Carolina meet NCDAQ's minimum threshold for a reasonable progress control evaluation for the Class I areas in these states. Thus, NCDAQ stated that it does not believe any of its emissions units provide significant contributions from sulfate-derived visibility impacts to these MANE-VU states' Class I areas, and expressed the State's willingness to participate in future consultations through VISTAS.

In their consultation discussions, the MANE-VU states identified twelve EGUs in North Carolina that they would like to see controlled to 90 percent efficiency. They also requested a control strategy to provide a 28 percent reduction in SO₂ emissions from sources other than EGUs that would be equivalent to their low sulfur fuel oil strategy. North Carolina has controlled or is expecting to control under the North Carolina CSA eleven of the twelve identified EGUs. Additionally, scrubbers are expected on three EGUs that were not identified by MANE-VU. NCDAQ believes that these reductions satisfy MANE-VU's request.

EPA proposes to find that North Carolina has adequately addressed the consultation requirements in the RHR and appropriately documented its consultation with other states in its SIP submittal.

2. Consultation with the FLMs

Through the VISTAS RPO, North Carolina and the nine other member states worked extensively with the FLMs from the U.S. Departments of the Interior and Agriculture to develop technical analyses that support the regional haze SIPs for the VISTAS states. The proposed regional haze plan for North Carolina was out for FLM and EPA discussions from August to September 2007. North Carolina subsequently modified the plan to address comments received on this initial version and reissued it for public comment from October to November 2007.

Regarding North Carolina's initial August 2, 2007, draft regional haze SIP and the proposed regional haze SIP released for public comment on October 12, 2007, the FLMs requested that the State provide more information in the SIP revision regarding two facilities, Blue Ridge Paper and PCS Phosphate-Aurora. Based on the Blue Ridge Paper's visibility impacts at multiple Class I areas, the FLMs asked the State to describe a plan to consult with the company on potential control actions prior to 2018 that may warrant a higher cost of control for reasonable progress. For PCS Phosphate, the FLMs expressed concern that the facility's BART determination for this facility did not fully evaluate the effectiveness and associated cost of controls. Other comments asked for clarification of items and for more discussion with specific source information for the AOI reasonable progress evaluations in the main body of the SIP, in addition to the appendices. North Carolina provided responses to the FLMs regarding their comments on the draft SIP. The State included more of the detailed reasonable progress control evaluation information in the main body of the SIP. Regarding Blue Ridge Paper, the State described that it acknowledged in the SIP that the company has visibility impacts on multiple Class I areas and has notified the company that although additional controls are not being required this implementation period, future periods may require controls. NCDAQ stated in the SIP that it is committed to work with the company over the next implementation period and encourage the company to modernize some of its processes with more efficient, less polluting equipment. For the two BART-eligible units at PCS Phosphate, the State noted that the facility is planning to shut down these units, and thus, it would not be prudent to install controls on them. For the two units subject to a reasonable progress control analysis, NCDAQ included additional language in the SIP stating that it has notified the company that although additional controls are

not being required this period, future implementation periods may require controls to be installed.

To address the requirement for continuing consultation procedures with the FLMs under 40 CFR 51.308(i)(4), NCDAQ made a commitment in the SIP to ongoing consultation with the FLMs on regional haze issues throughout implementation of its plan, including annual discussions of the implementation process and the most recent data from IMPROVE monitoring and VIEWS. NCDAQ also affirms in the SIP that FLM consultation is required for those sources subject to the State's NSR regulations.

G. Periodic SIP Revisions and Five-year Progress Reports

As also summarized in section IV.D of this notice, consistent with 40 CFR 51.308(g), NCDAQ affirmed its commitment to submitting a progress report in the form of a SIP revision to EPA every five years following this initial submittal of the North Carolina regional haze SIP. The report will evaluate the progress made towards the RPGs for each mandatory Class I area located within North Carolina and for each mandatory Class I area located outside North Carolina that may be affected by emissions from within North Carolina. North Carolina also offered recommendations for several technical improvements that, as funding allows, can support the State's next LTS. These recommendations are discussed in detail in the North Carolina submittal in Appendix K.

If another state's regional haze SIP identifies that North Carolina's SIP needs to be supplemented or modified, and if after appropriate consultation North Carolina agrees, today's action may be revisited, or additional information and/or changes will be addressed in the five-year progress report SIP revision.

V. What Action is EPA Proposing?

EPA is proposing a limited approval of a revision to the North Carolina SIP submitted by the State of North Carolina on December 17, 2007, as meeting some of the applicable regional haze requirements as set forth in sections 169A and 169B of the CAA and in 40 CFR 51.300-308, as described previously in this action.

VI. Statutory and Executive Order Reviews

A. Executive Order 12866, Regulatory Planning and Review

The Office of Management and Budget (OMB) has exempted this regulatory action from Executive Order 12866, entitled “Regulatory Planning and Review.”

B. Paperwork Reduction Act

Under the Paperwork Reduction Act, 44 U.S.C. 3501 et seq., OMB must approve all “collections of information” by EPA. The Act defines “collection of information” as a requirement for answers to * * * identical reporting or recordkeeping requirements imposed on ten or more persons * * *. 44 U.S.C. 3502(3)(A). The Paperwork Reduction Act does not apply to this action.

C. Regulatory Flexibility Act (RFA)

The RFA generally requires an agency to conduct a regulatory flexibility analysis of any rule subject to notice and comment rulemaking requirements unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Small

entities include small businesses, small not-for-profit enterprises, and small governmental jurisdictions.

This rule will not have a significant impact on a substantial number of small entities because SIP approvals under section 110 and subchapter I, part D of the CAA do not create any new requirements but simply approve requirements that the state is already imposing. Therefore, because the federal SIP approval does not create any new requirements, I certify that this action will not have a significant economic impact on a substantial number of small entities.

Moreover, due to the nature of the federal-state relationship under the CAA, preparation of a flexibility analysis would constitute federal inquiry into the economic reasonableness of state action. The CAA forbids EPA to base its actions concerning SIPs on such grounds. *Union Electric Co., v. EPA*, 427 U.S. 246, 255-66 (1976); 42 U.S.C. 7410(a)(2).

D. Unfunded Mandates Reform Act (UMRA)

Under sections 202 of the Unfunded Mandates Reform Act of 1995 (“Unfunded Mandates Act”), signed into law on March 22, 1995, EPA must prepare a budgetary impact statement to accompany any proposed or final rule that includes a federal mandate that may result in estimated costs to State, local, or tribal governments in the aggregate, or to the private sector, of \$100 million or more. Under section 205, EPA must select the most cost-effective and least burdensome alternative that achieves the objectives of the rule and is consistent with statutory requirements. Section 203 requires EPA to establish a plan for informing and advising any small governments that may be significantly or uniquely impacted by the rule.

EPA has determined that today’s proposal does not include a federal mandate that may result in estimated costs of \$100 million or more to either state, local, or tribal governments in

the aggregate, or to the private sector. This federal action proposes to approve pre-existing requirements under state or local law, and imposes no new requirements. Accordingly, no additional costs to state, local, or tribal governments, or to the private sector, result from this action.

E. Executive Order 13132, Federalism

Federalism (64 FR 43255, August 10, 1999) revokes and replaces Executive Orders 12612 (Federalism) and 12875 (Enhancing the Intergovernmental Partnership). Executive Order 13132 requires EPA to develop an accountable process to ensure “meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications.” “Policies that have federalism implications” is defined in the Executive Order to include regulations that have “substantial direct effects on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government.” Under Executive Order 13132, EPA may not issue a regulation that has federalism implications, that imposes substantial direct compliance costs, and that is not required by statute, unless the federal government provides the funds necessary to pay the direct compliance costs incurred by state and local governments, or EPA consults with state and local officials early in the process of developing the proposed regulation. EPA also may not issue a regulation that has federalism implications and that preempts state law unless the Agency consults with state and local officials early in the process of developing the proposed regulation.

This rule will not have substantial direct effects on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government, as specified in Executive Order 13132, because it

merely approves a state rule implementing a federal standard, and does not alter the relationship or the distribution of power and responsibilities established in the CAA. Thus, the requirements of section 6 of the Executive Order do not apply to this rule.

F. Executive Order 13175, Coordination with Indian Tribal Governments

Executive Order 13175, entitled “Consultation and Coordination with Indian Tribal Governments” (65 FR 67249, November 9, 2000), requires EPA to develop an accountable process to ensure “meaningful and timely input by tribal officials in the development of regulatory policies that have tribal implications.” This proposed rule does not have tribal implications, as specified in Executive Order 13175. It will not have substantial direct effects on tribal governments. Thus, Executive Order 13175 does not apply to this rule. EPA specifically solicits additional comment on this proposed rule from tribal officials.

G. Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks

Protection of Children from Environmental Health Risks and Safety Risks (62 FR 19885, April 23, 1997), applies to any rule that: (1) is determined to be “economically significant” as defined under Executive Order 12866, and (2) concerns an environmental health or safety risk that EPA has reason to believe may have a disproportionate effect on children. If the regulatory action meets both criteria, the Agency must evaluate the environmental health or safety effects of the planned rule on children, and explain why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by the Agency.

This rule is not subject to Executive Order 13045 because it does not involve decisions intended to mitigate environmental health or safety risks.

H. Executive Order 13211, Actions that Significantly Affect Energy Supply, Distribution, or Use

This rule is not subject to Executive Order 13211, “Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use” (66 FR 28355, May 22, 2001) because it is not a significant regulatory action under Executive Order 12866.

I. National Technology Transfer and Advancement Act (NTTAA)

Section 12 of the NTTAA of 1995 requires federal agencies to evaluate existing technical standards when developing a new regulation. To comply with NTTAA, EPA must consider and use “voluntary consensus standards” (VCS) if available and applicable when developing programs and policies unless doing so would be inconsistent with applicable law or otherwise impractical.

EPA believes that VCS are inapplicable to this action. Today’s action does not require the public to perform activities conducive to the use of VCS.

List of Subjects in 40 CFR Part 52

Environmental protection, Air pollution control, Intergovernmental relations, Nitrogen oxides, Particulate matter, Reporting and recordkeeping requirements, Sulfur dioxide, Volatile organic compounds.

AUTHORITY: 42 U.S.C. 7401 *et seq.*

Dated: February 15, 2012

Signed: A. Stanley Meiburg

Acting Regional Administrator,

Region 4

